POST-DISASTER NEEDS ASSESSMENT

2018 FLOODS, LAO PDR

UN in Lao PDR

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GFDRR
Global Facility for Disaster Reduction and Recovery

European Union

Front cover: Disaster-affected family in Sanamxay, Attapeu, August-September 2018. *Photo credit: UNFPA*

Disclaimer: This report summarizes the findings of the Post-Disaster Needs Assessment that took place between September 24 and October 19, 2018. The report is based on national data as of October 2018 gathered during the assessment.

Published and dated: Government of Lao People's Democratic Republic, December 2018.

PREPARED BY
THE GOVERNMENT OF THE
LAO PEOPLE'S DEMOCRATIC REPUBLIC

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UNDP
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Food and Agriculture Organization of the United Nations

INTERNATIONAL ORGANIZATION FOR MIGRATION
IOM·OIM
THE UNITED NATIONS MIGRATION AGENCY

United Nations Educational, Scientific and Cultural Organization

UNFPA

UN HABITAT
UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME

unicef
unite for children

UNOPS

UN WOMEN

WFP
World Food Programme

World Health Organization

care

gda
Gender Development Association

humanity &inclusion

PLAN INTERNATIONAL

Save the Children

SNV
Netherlands Development Organisation

World Vision

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Abbreviations and Acronyms

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BBB	Build Back Better
CFSVA	Comprehensive Food Security and Vulnerability Analysis
DBST	Double bituminous surface treatment
DHUP	Department of Housing and Urban Planning (of MPWT)
DICT	Department of Information, Culture, and Tourism (of MICT)
DMH	Department for Meteorology and Hydrology (of MNRE)
DOH	Department of Heritage (of MICT)
DoR	Department of Roads (of MPWT)
DOW	Department of Waterways (of MPWT)
DPWT	Department of Public Works and Transport (of MPWT)
DRF	Disaster Recovery Framework
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSW	Department of Social Welfare
EDL	Electricité du Laos
EMIS	Education Management Information System
ESRS	Education Sector Recovery Strategy
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GBV	Gender-based violence
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GFS	Gravity-fed system
ICH	Intangible cultural heritage
IDP	Internally displaced person
IPP	Independent power producer
JICA	Japan International Cooperation Agency
LAK	Lao Kip
LSIS	Lao Social Indicator Survey
MAF	Ministry of Agriculture and Forestry
MCTI	Mass, Culture, and Tourism Institute
MDG	Millennium Development Goal
MEM	Ministry of Energy and Mines
MIC	Ministry of Industry and Commerce

MICT	Ministry of Information, Culture, and Tourism
MLSW	Ministry of Labour and Social Welfare
MNRE	Ministry of Natural Resources and Environment
MoES	Ministry of Education and Sports
MoF	Ministry of Finance
MoH	Ministry of Health
MOHA	Ministry of Home Affairs
MOIC	Ministry of Industry and Commerce
MoNRE	Ministry of Natural Resources and Environment
MP	Master Plan
MPI	Ministry of Planning and Investment
MPWT	Ministry of Public Works and Transport
NDPCC	National Disaster Prevention and Control Committee
NSEDP	National Socio-economic Development Plan
PAFO	Provincial Agriculture and Forestry Office
PDNA	Post-Disaster Needs Assessment
PESS	Provincial Education and Sports Services
PNSE	Provincial Nam Papa State-Owned Enterprises
PNPSE	Provincial Nam Papa State Enterprises
PPWTO	Provincial Public Works and Transport Office
SBST	Single bituminous surface treatment
SMEs	Small and Medium-sized Enterprises
TDD	Tourism Development Department
TMD	Tourism Management Department
TMKD	Tourism Marketing Department
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
UXO	Unexploded Ordinance
WASH	Water supply, sanitation, and hygiene
WB	World Bank
WFP	World Food Programme
WH	World Heritage
WHO	World Health Organization
WVI	World Vision International

ບົດນຳ

ຍ້ອນສະພາບການປ່ຽນແປງຂອງດິນຟ້າອາກາດ ຊຶ່ງເປັນສາເຫດກໍ່ໃຫ້ເກີດພະຍຸເຂດຮ້ອນຂຶ້ນ, ໃນປີ 2018 ໄດ້ເກີດມີເຫດການໄພພິບັດຫຼາຍຄັ້ງເກີດຂຶ້ນ ທີ່ໄດ້ສ້າງ ຜົນກະທົບອັນໃຫຍ່ຫຼວງໃຫ້ແກ່ ສປປ ລາວ ເຊັ່ນ: ພາຍຸເຂດຮ້ອນເສີນຕິນ ໃນລະຫວ່າງ ວັນທີ 18-19 ກໍລະກົດ ເປັນສາຍເຫດເຮັດໃຫ້ຝົນຕົກໜັກຕິດຕໍ່ກັນຫຼາຍວັນ ຈຶ່ງເປັນສາເຫດເຮັດໃຫ້ຄູກັນນ້ຳອ່າງເກັບນ້ຳ ຂອງ ເຂື່ອນເຊປຽນ-ເຊນ້ຳນ້ອຍແຕກ ເປັນເຫດກໍ່ໃຫ້ເກີດນ້ຳຖ້ວມໜັກຢູ່ເມືອງສະໜາມໄຊ ແຂວງອັດຕະປື.[1]

ຕໍ່ກັບເຫດການໄພພິບັດທີ່ເກີດຂຶ້ນໃນຂອບເຂດທົ່ວປະເທດ ໂດຍສະເພາະແມ່ນຢູ່ເມືອງສະໜາມໄຊ ແຂວງອັດຕະປື, ລັດຖະບານ ແຫ່ງ ສປປ ລາວ ຕາງໜ້າໂດຍ ຄະນະສະເພາະກິດ ແກ້ໄຂໄພພິບັດລະດັບຊາດ ໂດຍການເປັນປະທານຂອງ ທ່ານຮອງນາຍົກລັດຖະມົນຕີ ແລະ ຄະນະກຳມະການປ້ອງກັນ ແລະ ຄວບຄຸມໄພພິບັດແຫ່ງຊາດ ໂດຍການເປັນປະທານ ຂອງ ລັດຖະມົນຕີ ກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສັງຄົມ ໄດ້ຕອບໂຕ້ກັບເຫດການເຫຼົ່ານັ້ນ ຢ່າງຮີບດ່ວນ ແລະ ໄດ້ເປີດຮັບເອົາການຊ່ວຍເຫຼືອຈາກສາກົນ ໃນວັນທີ 25 ກໍລະກົດ 2018. ບັນດາຄູ່ຮ່ວມພັດທະນາສາກົນ ແລະ ບັນດາສະມາຊິກ ຂອງ ທີມງານມະນຸດສະທຳ ກໍ່ໄດ້ປະກອບສ່ວນ ໃນການສະໜັບສະໜຸນ ລັດຖະບານ ສປປ ລາວ ໃນການຕອບໂຕ້ແກ້ໄຂໄພພິບັດທີ່ເກີດຂຶ້ນ. ພ້ອມກັນນັ້ນ, ບັນດາກຳລັງຕ່າງໆ ກໍ່ໄດ້ເຂົ້າຊ່ວຍໃນການຄົ້ນຫາ ແລະ ກູ້ໄພ ແລະ ໄດ້ຈັດສົ່ງສິ່ງຂອງຊ່ວຍເຫຼືອບັນເທົາທຸກຕ່າງໆ ເຊິ່ງປະກອບດ້ວຍ ເຕັ້ນພັກອາໄສຊົ່ວຄາວ, ເຄື່ອງນຸ່ງຫົ່ມ, ເຄື່ອງນອນ, ອາຫານ, ທີມແພດ, ເຄື່ອງຜະລິດນ້ຳສະອາດ ແບບສຸກເສີນ, ຫ້ອງນ້ຳ ແລະ ອື່ນໆ.

ເພື່ອປະເມີນ ຜົນກະທົບຈາກໄພພິບັດທີ່ເກີດຂຶ້ນ ໃຫ້ທົ່ວເຖິງ ແລະ ໄດ້ຮັບຂໍ້ມູນທີ່ລະອຽດ ພ້ອມທັງເພື່ອກຳນົດ ຄວາມຕ້ອງການ ສຳລັບການຟື້ນຟູ ແລະ ສ້າງຍຸດ ທະສາດເພື່ອຟື້ນຟູຫຼັງໄພພິບັດ, ລັດຖະບານ ແຫ່ງ ສປປ ລາວ ຈຶ່ງໄດ້ຈັດຕັ້ງດຳເນີນການປະເມີນຄວາມຕ້ອງການຫຼັງໄພພິບັດ (PDNA) ໃນຂອບເຂດທົ່ວປະເທດຂຶ້ນ ໂດຍການສະໜັບສະໜຸນ ຈາກ ອົງການສະຫະປະຊາຊາດ, ທະນາຄານໂລກ ແລະ ສະຫະພາບເອີຣົບ, ການປະເມີນຄວາມຕ້ອງການຫຼັງໄພພິບັດ ໄດ້ເປັນບາດກ້າວທຳອິດ ທີ່ຈະນຳໄປສູ່ການສ້າງແຜນງານຟື້ນຟູຫຼັງໄພພິບັດ ຢ່າງທົ່ວເຖິງ ເຊິ່ງຈະສົ່ງເສີມໃຫ້ເກີດຄວາມສະເໝີພາບ ແລະ ການມີສ່ວນຮ່ວມ. ຄະນະທີມງານທີ່ຈັດຕັ້ງການປະເ ມີນແມ່ນມີຄວາມສາມາດຫຼາກຫຼາຍດ້ານ ແລະ ໄດ້ນຳໃຊ້ວິທີການເຊິ່ງເປັນທີ່ຍອມຮັບໃນລະດັບສາກົນ ເພື່ອວັດແທກຜົນກະທົບຂອງໄພພິບັດ ແລະ ໄດ້ເຮັດ ການປະເມີນ ຜົນກະທົບທາງກົງ, ທາງອ້ອມ ແລະ ຜົນກະທົບທີ່ຕາມມາ ຈາກໄພພິບັດ ອີກດ້ວຍ.

ທີມງານດັ່ງກ່າວນີ້ ໄດ້ດຳເນີນການປະເມີນຜົນລະອຽດ ໃນລະຫວ່າງ ວັນທີ 24 ກັນຍາ ເຖິງວັນທີ 23 ຕຸລາ 2018 ໂດຍການຊີ້ນຳ ນຳພາຂອງ ທ່ານ ລັດຖະມົນຕີ ກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສັງຄົມ ໂດຍຜ່ານ ກອງເລຂາ ຄະນະກຳມະການປ້ອງກັນ ແລະ ຄວບຄຸມໄພພິບັດແຫ່ງຊາດ ແລະ ການມີສ່ວນຮ່ວມຈາກ ບັນດາກະຊວງອ້ອມຂ້າງສູນກາງ, ອຳນາດການປົກຄອງແຂວງ ແລະ ເມືອງ ພ້ອມທັງໄດ້ຮັບການຊ່ວຍເຫຼືອຈາກບັນດາຄູ່ຮ່ວມພັດທະນາສາກົນ. ຊຶ່ງການຄາດຄະເນແ ມ່ນໄດ້ອີງຕາມຂໍ້ມູນທີ່ ທີມງານເກັບກຳມາໄດ້ໃນເວລາລົງສຳຫຼວດພາກສະໜາມ, ສ່ວນຂໍ້ມູນເພີ່ມເຕີມນັ້ນ ແມ່ນໄດ້ມາຈາກ ບັນດາກະຊວງ, ອຳນາດການປົກຄອງແຂວງ ແລະ ເມືອງຕ່າງໆ. ຜົນຂອງການປະເມີນແມ່ນເຫັນວ່າໄພພິບັດ ໄດ້ທຳລາຍ ຊີວິດ ແລະ ຊັບສິນຂອງປະຊາຊົນ ແລະ ສ້າງຄວາມເສຍຫາຍ ທາງດ້ານເສດຖະກິດ ແລະ ສັງຄົມຫຼາຍ ເຊິ່ງໄດ້ກະທົບໂດຍກົງຕໍ່ 17 ແຂວງ ແລະ ນະຄອນຫຼວງວຽງຈັນ 90 ເມືອງ, 616,145 ຄົນ, ໄດ້ເຮັດໃຫ້ ມີຄົນເສຍຊີວິດ 56 ຄົນ ແລະ ສູນຫາຍ ຈຳນວນ 35 ຄົນ, ນອກນັ້ນ ຍັງມີເຮືອນ 1,620 ຫຼັງ ຖືກທຳລາຍ ແລະ ເນື້ອທີ່ນາປະມານ 102,481 ເຮັກຕາ ໄດ້ຮັບຄວາມເສຍຫາຍ ອີກດ້ວຍ.

ບົດລາຍງານ ການປະເມີນຄວາມຕ້ອງການຫຼັງເກີດໄພພິບັດ ສະບັບນີ້ ໄດ້ອະທິບາຍເຖິງການສູນເສຍຊີວິດ, ຄວາມເສຍຫາຍທາງດ້ານຊັບສິນ, ຄວາມສູນເ ສຍທາງດ້ານເສດຖະກິດ ທີ່ໜັກໜ່ວງ ແລະ ຜົນກະທົບຂອງໄພພິບັດ ຕໍ່ກັບ ເສດຖະກິດ ຂອງບັນດາແຂວງ ແລະ ເສດຖະກິດ ໃນທົ່ວປະເທດ. ບົດລາຍງານສະບັບນີ້ ຍັງໃຫ້ຂໍ້ມູນພື້ນຖານ ເພື່ອການສ້າງແຜນຟື້ນຟູ ແລະ ກໍ່ສ້າງຄືນໃໝ່ ແລະ ການຕິດຕາມ ຄວາມຄືບໜ້າຂອງແຜນເຫຼົ່ານັ້ນ. ບັນຫາທ້າທາຍ ໃນປະຈຸບັນນີ້ກໍ່ແມ່ນ ເພື່ອຮັບປະກັນວ່າ ຂັ້ນຕອນການຟື້ນຟູໃນເຂດທີ່ໄດ້ຮັບຜົນກະທົບນັ້ນມີມາດຕະການປັບຕົວ ເພື່ອຫຼຸດຜ່ອນຜົນກະທົບຈາກໄພພິບັດ ທີ່ອາດເກີດຂຶ້ນໃນອະນາຄົດ.

ນອກຈາກນັ້ນ, ບົດລາຍງານສະບັບນີ້ ຄາດວ່າຈະສາມາດປະກອບເປັນ ຂອບວຽກຟື້ນຟູໄພພິບັດ ເພື່ອຊ່ວຍໃຫ້ ສປປ ລາວ ສືບຕໍ່ຢູ່ໃນທິດທາງທີ່ດີ ເພື່ອປະຕິບັດ ແຜນພັດທະນາເສດຖະກິດ-ສັງຄົມແຫ່ງຊາດ ຄັ້ງທີ VIII, ພ້ອມທັງ ສະໜັບສະໜຸນຄວາມພະຍາຍາມ ແລະ ບູລິມະສິດ ຂອງປະເທດ ໃຫ້ສາມາດບັນລຸຕາມອາລະ ການພັດ ທະນາແບບຍືນຍົງ ໃນປີ 2030.

ໃນນາມຄະນະຮັບຜິດຊອບ ຂໍສະແດງຄວາມຂອບໃຈອັນເລິກເຊິ່ງ ມາຍັງ ບັນດາຄູ່ຮ່ວມງານທຸກພາກສ່ວນ ທີ່ໄດ້ໃຫ້ການຊ່ວຍເຫຼືອ ກອງເລຂາຂອງ ຄະນະກຳມະ ການປ້ອງກັນ ແລະ ຄວບຄຸມໄພພິບັດແຫ່ງຊາດ ເຊິ່ງຂຶ້ນກັບ ກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສັງຄົມ ໃນການຂຽນບົດລາຍງານສະບັບນີ້.

ປອ. ຄຳແພງ ໄຊສົມແພງ

ລັດຖະມົນຕີ ກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສັງຄົມ
ປະທານ ຄະນະກຳມະການປ້ອງກັນ ແລະ ຄວບຄຸມໄພພິບັດແຫ່ງຊາດ

1. ຂໍ້ມູນເປັນເດືອນຕຸລາ 2018.

FOREWORD

Three disaster events affected Lao PDR in 2018, including Tropical Storm Son-Tinh on July 18–19, followed by flash flooding on July 23–24, caused by a breach in the Xe pien-Xe Nam Noy hydropower saddle dam, and Tropical Storm Bebinca on August 17–18. The flooding caused widespread damage, destroying livelihoods and disrupting economic activity and social conditions and affecting 17 provinces and Vientiane Capital, comprising 90 districts and 616,145 people. It resulted in 56 fatalities and 35 people missing, 1,620 houses destroyed, and 102,481 hectares of land damaged. [1]

The Government of Lao PDR, through the National Disaster Prevention and Control Committee (NDPCC) chaired by the Deputy Prime Minister, responded immediately and welcomed international support on July 25, 2018. International development partners and members of the Humanitarian Country Team augmented national response efforts. The armed forces also engaged in search and rescue operations and delivered relief aid, including tents, blankets, food, medical personnel, emergency clean water facilities, and toilets.

To assess the full extent of the disaster's impact, define the needs for recovery, and design a recovery strategy, the Government of Lao PDR led a post-disaster needs assessment (PDNA) for the entire country. Facilitated by the UN Development Group, the World Bank, and the European Union, the PDNA was the first step toward developing a holistic recovery program that promotes equity and inclusion. A multidisciplinary team used internationally accepted methodology to measure the effects of the disaster and produced assessments of its direct, indirect, and secondary impacts.

The team undertook this comprehensive assessment between September 24 and October 23, 2018, led by the Ministry of Labour and Social Welfare through the PDNA Secretariat, with participation from line ministries and provincial and local governments and support from international development partners. Estimates are based on information collected by the team during field surveys, which complemented information provided by the line ministries and provincial and district governments.

This PDNA report describes the human losses, the damage to physical assets, the losses sustained across several economic activities, and the impact of the disaster on the provincial and national economies. It also provides the baseline data against which recovery and reconstruction plans can be designed and progress can be monitored. The challenge now is to ensure the recovery process in the affected regions introduces resilience measures to mitigate impacts from future disasters.

The report is expected to identify a disaster recovery framework to help keep Lao PDR on track to fulfill the Eighth National Socioeconomic Development Plan, while at the same time supporting the country's efforts and priorities to achieve the 2030 Agenda for Sustainable Development.

We would like to express our sincere appreciation to all partners who have assisted the PDNA Secretariat in the Ministry of Labour and Social Welfare in preparing this report.

Dr. Khampheng Saysompheng

Minister of Labour and Social Welfare
Chair of National Disaster Prevention and Control Committee

1. Data as of October 2018.

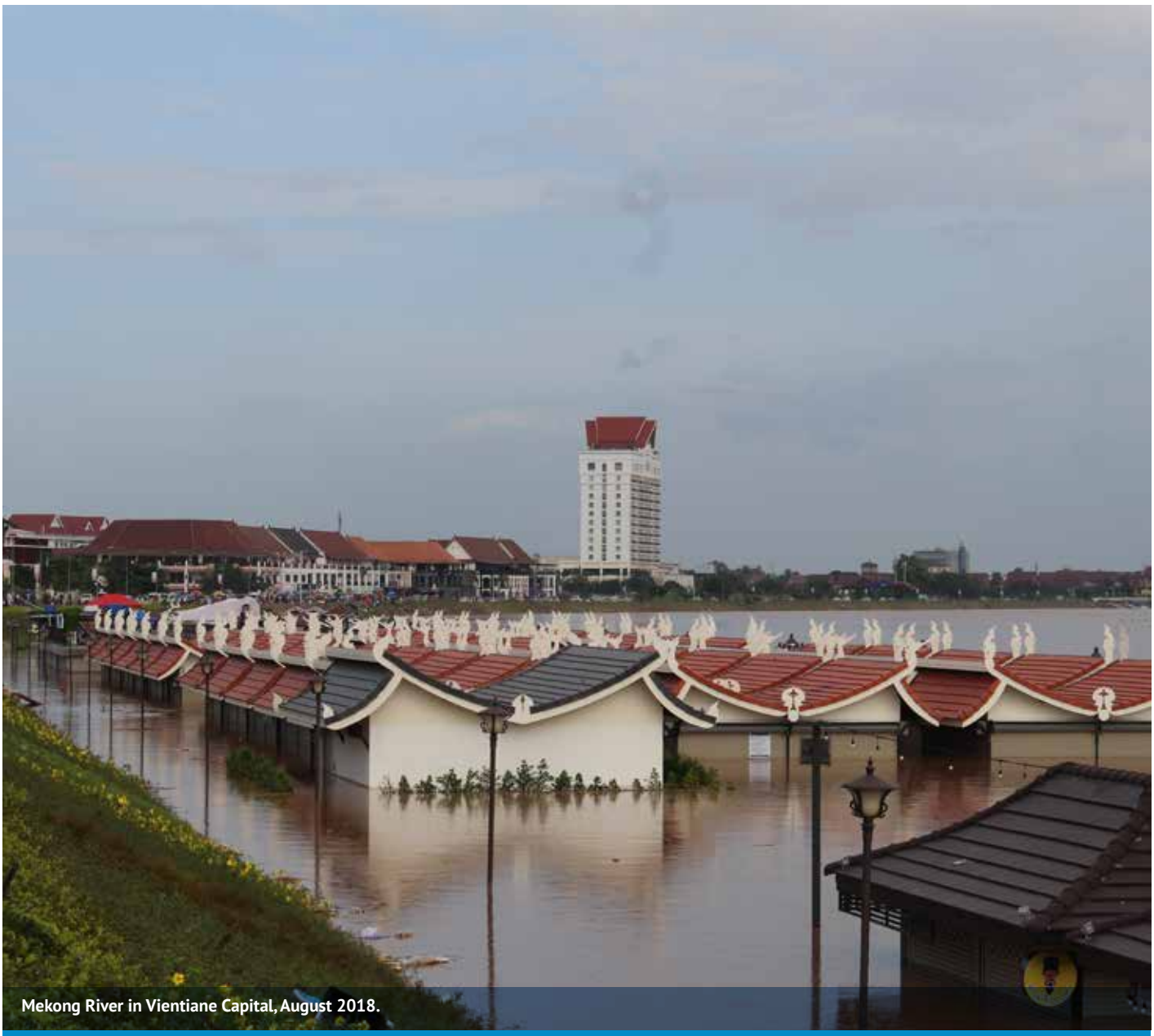
ACKNOWLEDGMENTS

This post-disaster needs assessment (PDNA) would not have been possible without the leadership of the Government of the Lao People's Democratic Republic (PDR) and the commitment and cooperation of various ministries, agencies, and departments that provided the time and expertise of their staff. These include the Ministry of Labour and Social Welfare, Ministry of Planning and Investment, Ministry of Foreign Affairs, Ministry of Finance, Ministry of Public Works and Transportation, Ministry of Education and Sports, Ministry of Health, Ministry of Agriculture and Forestry, Ministry of Information, Culture, and Tourism, Ministry of Industry and Commerce, Ministry of Energy and Mines, Ministry of Natural Resources and Environment, Ministry of Home Affairs, Ministry of Justice, Ministry of Public Security, Lao Statistics Bureau, Lao Women's Union, National Regulatory Authority, and Unexploded Ordinance (UXO) Lao. Their dedication underpins this government-led approach to Disaster Risk Management and is a model for improved coordination while working together for a more resilient Lao PDR.

The report was produced under the leadership of His Excellency Dr. Khampheng Saysompheng, Minister of Labour and Social Welfare and Chair of the National Disaster Prevention and Control Committee. The PDNA was supported by a Secretariat, led by Mr. Vilayphong Sisomvang (Ministry of Labor and Social Welfare), Henrike Brecht (World Bank), Jakob Schemel (UN Resident Coordinator's Office) and Bryan Fornari (European Union).

The PDNA team is grateful for the technical and financial support from the Agence Française de Développement (AFD), CARE, European Union (EU), Food and Agriculture Organisation (FAO), Gender Development Association (GDA), Humanity and Inclusion, International Organization for Migration (IOM), Plan International, Save the Children, SNV Netherlands Development Organisation, United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Population Fund (UNFPA), United Nations Children's Fund (UNICEF), United Nations Development Programme (UNDP), United Nationa United Nations Human Settlements Programme (UN-Habitat) United Nations Office for Project Services (UNOPS), UN Women - United Nations Entity for Gender Equality (UN Women), World Food Programme (WFP), World Health Organization (WHO), World Vision, and the World Bank Group/Global Facility for Disaster Reduction and Recovery (GFDRR) which provided the overall guidance for the process.

We also would like to thank the national and international experts who contributed to the PDNA, including Silke Pietzsch and Thiphavong Boupha (FAO), Margaret Jones Williams, Sanny Ramos Jegillos, Michael Thurman, Emmanuel Torrente, Lu'lu Muhammad, Gerson Brandao, Olivier Bauduin, Phetsamone Southalack, Chitlatda Keomuongchanh, Jerome Dubois-Mercent, and Sirixai Phanthavongs (UNDP), Hanh Duong Bich (UNESCO), Phonexay Sithirajvongsa (UNFPA), Buahom Sengkhamyong (UN-Habitat), Takaho Fukami and Bishnu Timilsina (UNICEF), Samir Belabbes and Khaled Mashfiq (UNITAR), Franck Caussin (UNOPS), Piet Vochten (WFP), Isabelle Devaux and Jana Lai (WHO), Phetsakhone Somphongbouthakanh (CARE), Kiran Dattani Pitt (Humanity and Inclusion), Elizabeth Thipphawong (GDA), Tara I.M. (Plan International), Zuzana Stanton-Geddes, Michael Bonte-Grapentin, Guillermo Siercke, Sombath Southivong, Zhijun Chen, Takafumi Kadono, Viengsamay Vongkhamsao, Amphavanh Sisouvanh, Yasuko Kusakari, Kenichi Kitamura, Robin Lewis, and Asha Kambon (World Bank), as well as the many others who have contributed and/or provided peer review comments. To all the contributors, the PDNA team expresses its sincere gratitude and appreciation.



Mekong River in Vientiane Capital, August 2018.

Photo credit: UN Lao PDR, Somlith Khounpaseuth.

EXECUTIVE SUMMARY

SUMMARY OF DAMAGE AND LOSSES

Lao PDR has been severely affected by floods between July and September 2018.' (currently says 'in recent months'). On July 18–19, Tropical Storm Son-Tinh caused heavy rains and flooding in 55 districts of 13 provinces across the country. On the night of July 23–24, a breach in the Xe Pien-Xe Nam Noy hydropower saddle dam caused an unprecedented flash flood in Attapeu Province. And on August 16–18, Tropical Storm Bebinca also affected the northern part of Lao PDR.

The post-disaster needs assessment (PDNA) valued the total overall effects of the floods on the economy at an estimated 3,166.99 billion Lao kip, or approximately US$371.5 million (see Table 1). Total damage accounted for 1,253.10 billion Lao kip, and losses totaled 1,914.02 billion Lao kip. In terms of geographical spread, Vientiane Capital, Huaphanh, Khammuane, and Attapeu were worst affected. Attapeu and Huaphanh had the highest per capita impacts.[2] Following the dam break, Attapeu Province had damage and losses estimated at US$35 million—just under 10 percent of the total effects—an amount that includes additional flooding from heavy rains.

The floods produced different effects across economic and social sectors. Agriculture, including crops, fisheries, livestock, forestry, and irrigation, suffered the most losses, amounting to 57 percent of the total losses. The transport sector, including roads, bridges, transport services, and government buildings, accounted for 65.6 percent of the overall damage and 40 percent of losses. The waterways sector was also heavily affected. Overall, the public domain was heavily affected in terms of both losses and damage, especially the productive and infrastructure sectors. Private domain losses were driven by reduced income to farmers, persons involved in small- and medium-sized enterprises (SMEs), and those providing services in the culture and tourism sectors. Small farmers, workers, and owners of SMEs have directly felt the burden of the disaster.

Table 1 — Summary of the Damage and Losses (billion Lao Kip)

SECTOR	DAMAGE	LOSSES	TOTAL
Social sectors			
Housing and settlements	21.2	0.57	21.69
Education	18.73	1.68	20.41
Health and nutrition	8.58	3.32	11.89
Culture	10.11	0.25	10.36
Productive sectors			
Agriculture: crops, livestock, fisheries, forestry, irrigation	139.80	1,087.60	1,227.30
Industry and commerce	0.80	2.99	3.78
Tourism	21.87	9.59	31.46
Infrastructure sectors			
Transport	822.02	784.80	1,607.82
Electricity	42.20	3.20	45.40
Water supply and sanitation	50.96	19.02	69.98
Waterways	116.90		116.90
TOTAL	**1253.10**	**1,914.20**	**3,166.99**
TOTAL (MILLION US$, APPROXIMATE)	**147**	**224.5**	**371.5**

Source: Estimates based on Government of Lao PDR data

2. The order in which the provinces are listed is based on a list and code provided in the Population and Housing Census 2015, Lao Statistics Bureau, Ministry of Planning and Investment, https://www.lsb.gov.la/pdf/PHC-ENG-FNAL-WEB.pdf.

SUMMARY OF MACROECONOMIC IMPACT ASSESSMENT

Lao PDR's economy grew 6.89 percent in 2017, decreasing slightly from 7.02 percent in 2016. Based on current prices, the country's gross domestic product (GDP) increased from 129,279 billion Lao kip to 140,749 billion Lao kip, and its GDP per capita achieved 20.25 million Lao kip (approximately US$2,472.[3]0). The growth in GDP was mainly supported by expansion of the electricity and wholesale and retail trade sectors, among others. With regard to the fiscal performance of the Government of Lao PDR, the deficit in the 2017 budget amounted to 7,810.99 billion Lao kip, which accounted for 5.55 percent of GDP. Total revenue reached 22,615.49 billion Lao kip, which covered 16.07 percent of GDP, while total expenditure reached 30,426.49 billion Lao kip, accounting for 21.62 percent.

The overall impact of the flood was significant compared to the previous two flood events in 2009 and 2011. The disaster had a modest impact on the main drivers of the economy and therefore didn't result in a major slowing of growth. The overall value of the estimated disaster effects amounts to 2.01 percent of Lao PDR's projected GDP for 2018, representing 9.6 percent of the country's annual budget. The effects on the balance of payments are moderate. The current account deficit is expected to widen slightly to about 13 percent in 2018. In terms of the effect on the government's fiscal position, flood related fiscal losses are pegged at 0.4 percentage points of GDP in 2018 due to actions taken by government to mitigate the impact of the flood. The impact of the 2018 flood will adversely affect the fiscal balance in 2019 as well due to the ongoing reconstruction efforts throughout next year. Specifically, in 2019, the fiscal deficit is expected to be 0.9 percentage points higher.

SUMMARY OF HUMAN AND SOCIAL IMPACTS

The floods have had serious implications for people and society in Lao PDR. Unless adequately addressed, loss of income from the destruction of farms and microenterprises, coupled with disruption of social services, can exacerbate existing nutrition, health, and education challenges. Any reduction in income would adversely affect expenditure, particularly on nutrition among the rural population, of whom 14.2 percent are estimated to be food insecure. In some flood-affected areas, increases have already been observed in the incidence of malnutrition, dengue fever, pneumo-bronchitis, common colds, diarrhea with blood and severe dehydration, and skin diseases. In some affected areas, pupils have lost their uniforms and learning materials, which may result in their skipping school if sources of family income are not restored immediately. Another burden for those who have lost their livelihoods is an increase in debt among the 70 percent of households who normally already have debts, mostly for agriculture inputs, at the time of year the floods occurred. The total destruction of crops or substantial reduction in harvest will add to the financial burden of these farmer-borrowers who will, most probably, have to secure additional production loans. Furthermore, in a situation where only 0.8 million out of a working-age population of 4.8 million are covered by a social protection scheme and thus limited safety nets, out migration for employment can be expected to increase if livelihoods are not immediately restored. Since almost 60 percent of those who migrate for work are women, this exodus may cause family breakdowns and put those left behind in vulnerable situations, as well.

The floods also exacerbated the preexisting inequalities faced by poorer households, particularly the more vulnerable women, men, boys, girls, people with disabilities, and other marginalized groups, to varying degrees; impacts for these groups were observed on employment levels, income, food security, gender-based violence, and general safety and security. As in many other disaster situations, the floods increased women's workloads and risks of gender-based violence as a result of the breakdown of community protection systems and residence at overcrowded, unsecured camps with limited privacy for women or men, among other factors.

3. Bank of Lao PDR, Annual Economic Report 2018.

Table 2 — Summary of Recovery and Reconstruction Needs (billion Lao Kip)

SECTOR	SHORT-TERM	MEDIUM-TERM	LONG-TERM	TOTAL NEEDS
Social sectors	**234**	**79**	**37**	**350**
Housing and settlements	29.00	44.60		73.60
Education	168.90	18.90	9.80	197.60
Health and nutrition	27.31			27.31
Culture	8.57	15.46	27.56	51.59
Productive sectors	**264**	**108**	**29**	**400**
Agriculture: crops, livestock, fisheries, forestry, irrigation	231.50	97.00	28.80	357.30
Industry and commerce	1.50	3.20		4.70
Tourism	30.75	7.37	0.23	38.35
Infrastructure sectors	**687**	**742**	**1,006**	**2,435**
Transport	582.13	658.56	833.94	2,074.63
Water supply and sanitation	30.91	19.65	17.96	68.52
Waterways	32.00	63.60	154.40	250.00
Electricity	42.20			42.20
Cross-cutting issues	**129**	**179**	**929**	**1,237**
Disaster risk management; environment and climate change	17.25	106.11	52.64	176.00
Governance	11.69	0.00	61.02	72.71
Human development (employment and livelihoods, gender, disability, and child protection)	73.10	73.20	54.60	200.90
UXO	26.61		760.79	787.40
TOTAL	**1,313**	**1,108**	**2,002**	**4,423**
TOTAL (MILLION US$, APPROXIMATE)	**154**	**130**	**235**	**520**

Source: Estimates based on Government of Lao PDR data.

Trafficking has been a risk, particularly for children, and significant psychosocial suffering was detected among vulnerable children and families in all disaster-affected provinces. No systematic child protection mechanism is in place, and anecdotal evidence has suggested an urgent need to respond to psychosocial needs and trauma on the part of both children and adults. Field assessments further revealed stigma and discrimination for adult internally displaced persons with disabilities, who are reported to be encountering increased barriers to access to aid and facilities.

SUMMARY OF RECOVERY AND RECONSTRUCTION NEEDS

The needs for resources for flood recovery in the short, medium, and long terms are considerable, totaling an estimated 4,422.86 billion Lao kip (around US$520 million), as per Table 2. The needs are higher than damage and losses since they include, first, the application of a "build back better" approach to the reconstruction of damaged infrastructure that reduces risks; and, second, the resumption of production, service delivery, and access to goods and services. The cost of recovery is greatest in the infrastructure sectors (55.1 percent), followed by the cross-cutting issues (28 percent). Within sectors, high needs are estimated for transport, agriculture, and waterways. Costs associated with unexploded ordinance (UXO) include clearing land that was cleared before but needs to be surveyed again, since UXO may have been shifted by the floods.

DISASTER RECOVERY FRAMEWORK

Based on these findings, the following are recommended with regard to the principles and key issues to focus on during recovery:

- **Rapid rebuilding of people's livelihoods and the revitalization of the local economy, focusing on the most vulnerable and socially disadvantaged groups**. The immediate restoration of livelihoods will avert food shortages and lessen the dependency of the people on outside aid.
- **Securing of development gains.** Recovery activities, although separate from development activities, must be supportive of existing development plans and must attempt to reestablish and secure previous development gains.
- **Coordinated and coherent approaches to recovery.** Projects for disaster recovery must include full and effective coordination among all involved agencies based on comprehensive information exchange, flexibility in administrative procedures, and uniformity of policies.
- **Building back better (BBB).** Recovery activities based on BBB principles will promote longer-term Disaster Risk Management.

The following are key priorities for resilient recovery:

- Ensuring the safety and security of the affected population
- Economic recovery and revitalization focusing on the most needy
- Creating resiliency through BBB
- Building the capacity of the national and local governments and communities for Disaster Risk Management for sustainable development
- Improving coordination with development partners as well as local governments

The PDNA serves as a basis for formulating a recovery plan whose general principles, policies, and strategies are guided by a disaster recovery framework (DRF). The DRF must ensure the recovery plan will address whatever setbacks were caused by the floods and bring the economy back on track with the objectives of the 8th National Socioeconomic Development Plan (NSEDP). The Ministry of Planning and Investments (MPI) has been identified as the lead ministry within the Government of Lao PDR for drafting and implementing the disaster recovery plan and ensuring alignment with the 8th NSEDP. Consultations are required with the relevant line ministries on the sectoral plans, as well as on the overall disaster recovery framework.

Development of the DRF should begin with creating a vision for recovery and defining strategic objectives underpinned by adherence to national policy and institutional frameworks. Sector plans must be relevant to the respective sectors and should provide for resource mobilization and, finally, for implementation. In developing the recovery plan, the government must coordinate with development partners for assistance, identifying the areas in which the respective partners can provide support.

The DRF should anchor a recovery plan that will rapidly rehabilitate affected assets, rebuild people's livelihoods—especially the livelihoods of those in the most vulnerable and socially disadvantaged groups—and revitalize the local economy. The consultations with the ministries and with development partners should be initiated immediately, with adjustments made as needed to overall management, project development, procurement, and implementation to fast-track the rehabilitation and recovery process. Once the annual expenditure requirements for recovery are finalized, the appropriate agencies can develop financing plans or strategies to accommodate the additional budgetary requirements for recovery.

Photo credit: DPWT of Oudomxay Province and World Bank.

Nam Papa team of Beng District, Oudomxay Province, carries out emergency repairs to damaged urban water supply systems.

INTRODUCTION

DISASTER RISK PROFILE OF LAO PDR

Lao PDR is exposed to high climate and disaster risks, including floods, landslides, droughts, and tropical storms and cyclones. Vast stretches of land are also heavily contaminated by unexploded ordinance (UXO). From 1970 to 2010, 33 natural hazard events (mostly floods and droughts) were registered, affecting almost 9 million people and causing economic damage of more than US$400 million. Flooding is the major natural hazard in Lao PDR, with the Mekong River as its primary source. The river basin hydrology leads to extreme flooding in one portion of the basin, with average or below-average water levels prevailing elsewhere. The development of hydroelectric dams has led to the hydrology of the Mekong River being increasingly affected by the regulation of releases from them.

Lao PDR experienced major typhoons in 2009 (Ketsana) and 2011 (Haima), which resulted in damage and losses of $58 million and $170 million respectively, as well as severe flooding in 2013, which caused damage and losses in excess of US$270 million. The impacts of disasters in Lao PDR create large costs for the government, businesses, and households. Using basic modeled flood impacts, the World Bank has estimated annual expected losses for Lao PDR from flood events ranging from 2.8 percent to 3.6 percent of gross domestic product (GDP). Expected economic losses from a high-impact flood (one occurring on average once every 100 years) are 11.7 percent of GDP.[4] The estimated average annual fiscal cost of floods is 2.7 percent of government expenditures. In years with more severe events, the cost can be as high as 9 percent of budget expenditures. With rapid economic development and the effects of climate change, disasters are expected to become more severe and could cause higher impacts to the country.

The potential impacts of climate change further contribute to the vulnerability of Lao PDR. The increased levels of precipitation and rising temperatures projected could result in greater variability of the hydrological regime of the Mekong River. An increase in the risk of both floods and droughts is expected. Historical records from 1951 to 2012 show temperatures have increased an average of 0.1°C per decade and total rainfall an average of 1.6 mm per decade. Climate change–induced extreme weather events, such as more frequent and intense cyclones that develop in the South China Sea, may make landfall along the central Vietnam coast before tracking inland to Lao PDR.

High vulnerability and substantial capacity gaps exacerbate the frequency, intensity, and impacts of disasters in Lao PDR. Some 70 percent of the country's population work in the agriculture sector, which is heavily affected by climate-related events. The country's reliance on extractive uses of natural resources also increases climate and disaster risks while causing environmental degradation. Resilience at the community level is low due to the prevalence of monoculture, lack of diversity in livelihoods, and limited infrastructure. Increased variability in precipitation and temperatures associated with climate change is projected to have severe impacts on crops, livestock, fisheries, and human health. The poor and vulnerable will be most affected, as they have fewest options to mitigate risks.

4. Based on analysis using historical loss data from the Emergency Events Database (EM-DAT). World Bank, Advancing Disaster Risk Financing and Insurance in ASEAN Member States: Framework and Options for Implementation, vol. 1, main report (Washington, DC: World Bank).

SOCIOECONOMIC CONTEXT OF LAO PDR

Lao PDR is one of the fastest growing economies in East Asia and the Pacific. The country is endowed with abundant natural resources and has made significant strides toward improving access to electricity, schools, and roads, while also becoming an important energy exporter. GDP growth averaged 7.8 percent over the last decade, with income per capita reaching US$2,477 in 2017.[5] These economic advances were mainly driven by a buoyant growth in the power, construction, and manufacturing sectors. In the near term, growth is expected to remain robust.[6] In 2019–20, large hydropower projects, which are slated to begin commercial operation, and continued infrastructure investment are expected to spur growth.

Between 2002–3 and 2012–13, absolute poverty, based on the national poverty line, declined from 33.5 percent of the population to 23.2 percent.[7] The decline was driven by increasing human capital and access to land and the creation of off-farm jobs. Although the rate of poverty has declined considerably in the past 15 years, the poverty headcount ratio of US$1.90 a day (2011 purchasing power parity) is 28.8 percent.[8] At present, the government is seeking to maintain macroeconomic stability by taking actions to improve domestic revenue collection, controlling expenditure, and strengthening public debt management. The result will be fiscal consolidation, with the deficit expected to decrease to below 5 percent of GDP in 2018 from 5.3 percent the previous year. Such fiscal consolidation is expected to slow down the accumulation of public debt, though not enough to reverse the rising debt to GDP ratio.[9]

Lao PDR has made good progress in human development outcomes over the past 20 years, including halving poverty, reducing hunger, and improving education and health outcomes. Room remains for improvement, however. The population of 6.5 million is rapidly increasing, and more needs to be done to improve levels as well as the quality of education. Malnutrition still affects many children under age five. Total fertility rates are declining, with the demand for family planning unattended. Another gender-related indicator that calls for renewed efforts is the maternal mortality rate, which remains high at 226 per 100,000 births (2015), with 38 percent of births occurring in a health facility.[10] This reduces economic potential, reinforces malnutrition, and increases health risks.

DESCRIPTION OF 2018 DISASTER

Between July and September 2018, Lao PDR experienced widespread floods that significantly affected its people and economy. On July 18–19, Tropical Storm Son-Tinh caused heavy rains and flooding in 55 districts of 13 provinces across the country. On the night of July 23–24, a breach in the Xe Pien-Xe Nam Noy hydropower saddle dam caused an unprecedented flash flood in Attapeu Province; the result was over five billion cubic meters of water—equal to two million Olympic-size swimming pools—inundating an estimated 55,000 hectares of land and covering it with mud and sludge. Less than one month later, on August 16–18, Tropical Storm Bebinca hit Vietnam and Lao PDR, causing flooding and related secondary impacts in 116 districts and 2,400 villages in all provinces of the country and landslides that resulted in damage to housing and infrastructure and losses to agricultural lands and livelihoods, among other effects. In aggregate terms, as of October 15, 2018, the floods had affected a total of 2,382 villages and 126,736 households, with an estimated total of 616,145 people, across all 18 provinces.[11] The impacts from the two waves of the disaster are presented in Table 3.

5. Based on World Development Indicator (WDI), Macro Poverty Outlook, and official data

6. World Bank, World Bank East Asia and Pacific Economic Update, October 2018: Navigating Uncertainty (Washington, DC: World Bank, 2018).

7. World Bank, Lao PDR—Systematic Country Diagnostic: Priorities for Ending Poverty and Boosting Shared Prosperity (English) (Washington, DC: World Bank Group, 2017).

7. World Bank, Poverty Profile in Lao PDR (Washington, DC: World Bank, 2014).

9. Ibid., 125

10. Lao Statistics Bureau, Ministry of Planning and Investment, Population and Housing Census 2015.

11. While officiallly Lao PDR has 17 provinces and one municipal area, Lao Capital is often included in the count of 18 provinces.

Table 3 — Summary of Damage and Losses in Lao PDR Resulting from the 2018 Floods

SECTOR	AS OF AUGUST 2, 2018	AS OF SEPTEMBER 21, 2018	AS OF OCTOBER 15, 2018
Districts flooded	55	116	--
Villages affected	n.a.	2,400	2,382
Households affected	24,000	132,000	126,736
People affected	--	--	616,145
Fatalities	13	55	56
Evacuees	~6,000	~17,000	16,739
Missing	--	--	35
Houses destroyed	n.a.	1,772	1,779
Schools affected	n.a.	272	--
Roads flooded/damaged (km)	31	483	630
Bridges damaged	14	47	47
Paddy damaged (ha)	55,000	~100,000	90,000
Cropland damaged (ha)	n.a.	7,400	--
Large livestock losses	n.a.	17,000	--
Poultry losses	n.a.	79,000	--

Source: Emergency Operations Centre, Ministry of Labour and Social Welfare.

GOVERNMENT AND HUMANITARIAN RESPONSE

The Government of Lao PDR has led and coordinated the response operation through the National Disaster Prevention and Control Committee chaired by the Vice Prime Minister, and with the Department of Social Welfare at the Ministry of Labor and Social Welfare (MLSW) as lead coordinator. On July 25, 2018, the Prime Minister of Lao PDR declared Sanamxay District as a National Emergency Disaster Zone and welcomed international support through Lao PDR's National Disaster Prevention and Control Committee. In the aftermath of the Attapeu event, the government coordinated with a wide range of development partners to secure support for immediate humanitarian assistance, including search and rescue operations, distribution of relief items, application of medical aid and supplies, establishment of shelters and camps, victims' assistance, and relocation activities. On September 3, 2018, the government asked the international community to assist with a post-disaster needs analysis (PDNA).

In August, the Humanitarian Country Team launched a US$43 million Disaster Response Plan complementing the government's response across the country to provide lifesaving assistance to people affected by the floods and reestablish basic services; to support the restoration of livelihoods and self-reliance; and to provide safety and protection for vulnerable people. As of October 2018, around US$8 million had been mobilized, including US$3.5 million from the Central Emergency Response Fund, as well as contributions from bilateral sources, including Australia, Ireland, the Republic of Korea, Turkey, and the United States. The response was coordinated by eight humanitarian clusters, bringing together the Government of Lao PDR, United Nations agencies, and international nongovernmental organizations. The clusters included education; food security and nutrition; health; protection; shelter; water, sanitation, and hygiene; logistics; and early recovery. The governments of Australia, China, Japan, the Republic of Korea, Thailand, and Vietnam, among others, also extended emergency assistance.[12] The World Bank is supporting emergency repairs of roads and bridges in the affected areas in the amount of approximately US$4 million through adjustments in an ongoing transport project.

12. Lao News Agency, July 26, 2018, http://kpl.gov.la/En/Detail.aspx?id=36409.

ASSESSMENT METHODOLOGY

The PDNA was led by the Government of Lao PDR and conducted by a multidisciplinary, multiagency team comprising the European Union (EU), the United Nations, the World Bank/Global Facility for Disaster Reduction and Recovery, and other relevant stakeholders, in accordance with the Joint Declaration on Post-Crisis Assessments and Recovery Planning signed by the EU, the United Nations Sustainable Development Group, and the World Bank. The assessment methodology is based on the damage and losses assessment guidelines,[13] with the objective of assessing disaster effects (based on the quantification of damage and losses) and disaster impacts and identifying recovery strategies and needs:

- **Damage** is estimated in terms of the replacement value of both public- and private-domain physical assets damaged or destroyed, built to the same standards as prevailed before the disaster.
- **Losses** are estimated based on the changes in economic flows resulting from the temporary absence of the damaged assets or disruption to access to goods and services in terms of reduced revenue; higher operational costs; and actions taken to reduce risk.
- From the damage and losses, **the disaster's impact** on economic performance, employment, and poverty can be assessed.
- **Needs for recovery** are based on losses in terms of recuperation of economic and human needs, livelihoods, access to services, means of production, security, and so forth. Needs take into account both reconstruction needs to build back better (BBB)[14] and needs to reduce risk by reducing vulnerabilities and building resilience.

The assessment of the impact of a disaster encompasses impacts on the macroeconomy, employment, livelihoods, and households. Economic impact at the macro level includes the estimation of the disaster's likely effects on economic performance and the temporary macroeconomic imbalances that may arise from the disaster. Social and household impact includes the impacts of the disaster on household and community livelihoods and employment, gender-specific impacts, and impacts on vulnerable groups, such as people with disabilities and the elderly. The identified effects and recovery needs form the basis for determining recovery, reconstruction, and resilience interventions in the short, medium, and long terms.

Specifics and Limitations of this PDNA: The geographical context of this PDNA covers all 17 provinces and one municipality of Lao PDR. The assessment team was constrained by the limited time frame for the assessment, which was carried out from September 24 to October 19, 2018. The quality and accessibility of data posed challenges to the sectoral assessment teams, composed of international and national sector specialists. This assessment was completed in several weeks after the last flood event in September 2018, and it reports only on data received at the time of writing. The damage, losses, and needs may, therefore, be underestimated.

13. European Commission, the United National Development Group, and World Bank, 2013 Post-Disaster Needs Assessments Guidelines, http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Climate%20Strategies/PDNA%20Volume%20A%20FINAL%2012th%20Review_March%202015.pdf.
14. BBB is a reconstruction approach that seeks to reduce vulnerability and improve living conditions while promoting more effective and sustainable reconstruction. It takes the opportunity of having to rebuild following a disaster event to examine the suitability and sustainability of reconstruction activities.

Attapeu, August 2018.

Photo credit: Ministry of Information, Culture and Tourism

ECONOMIC AND SOCIAL IMPACTS

MACROECONOMIC IMPACT

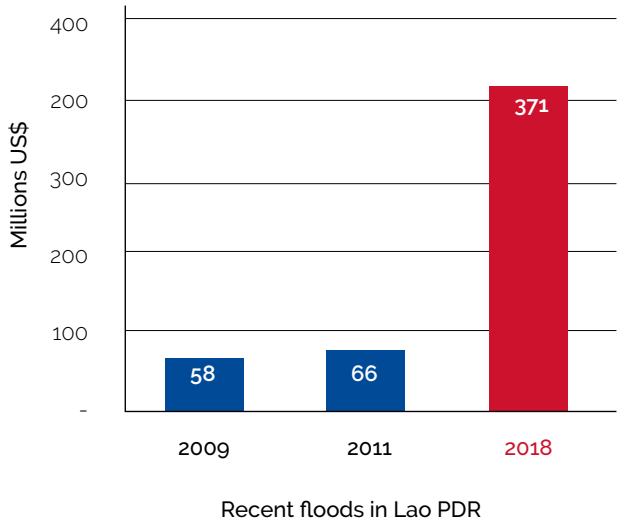
MACROECONOMIC IMPACT SUMMARY

The total cost of the 2018 floods in Lao PDR is estimated at 3,166.9 billion Lao kip (US$371 million), or around 2.1 percent of projected gross domestic product (GDP) for the year (see Figure 1). The damage (mostly to physical infrastructure and assets) amounted to 1,253.1 billion Lao kip (approximately US$147 million), while production losses (mainly to agriculture, trade, and transport services) were an estimated 1,914.02 billion Lao kip (approximately US$224 million), as illustrated in Figure 2. The needs for resources for flood recovery in the short, medium, and long terms are considerable, totaling an estimated 4,422.86 billion Lao kip, or US$520.34 million, with infrastructure sectors recording the largest part of the recovery cost.

The impact of the floods on real sector performance and overall macroeconomic aggregates in 2018 is expected to be limited, as key economic sectors driving the growth were not affected. Nevertheless, the real GDP growth projection for 2018 has been revised downward from 6.7 percent to 6.5 percent because of the floods.

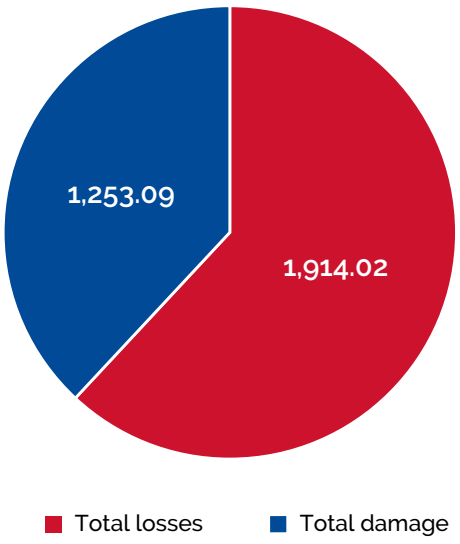
While the Government of Lao PDR will continue on the path of fiscal consolidation, it is, in response to the floods, reprioritizing expenditure toward the affected regions and providing tax exemptions to the affected businesses, resulting in a budget deficit of 4.7 percent of GDP, as compared to 4.3 percent without these expenses. The impact of the 2018 flood will adversely affect the fiscal balance in 2019 as well due to the ongoing reconstruction efforts throughout next year. Specifically, in 2019, the fiscal deficit is expected to be 0.9 percentage points higher. The disruptions to economic activity caused by the floods are not expected to have a significant impact on the balance of payments.

Figure 1 — Total Estimated Cost of Recent Floods in Lao PDR in 2009, 2011, and 2018



Source: Estimates based on Government of Lao PDR data.

Figure 2 — Cost Breakdown of the 2018 Floods by Damage and Losses (billion Kip)



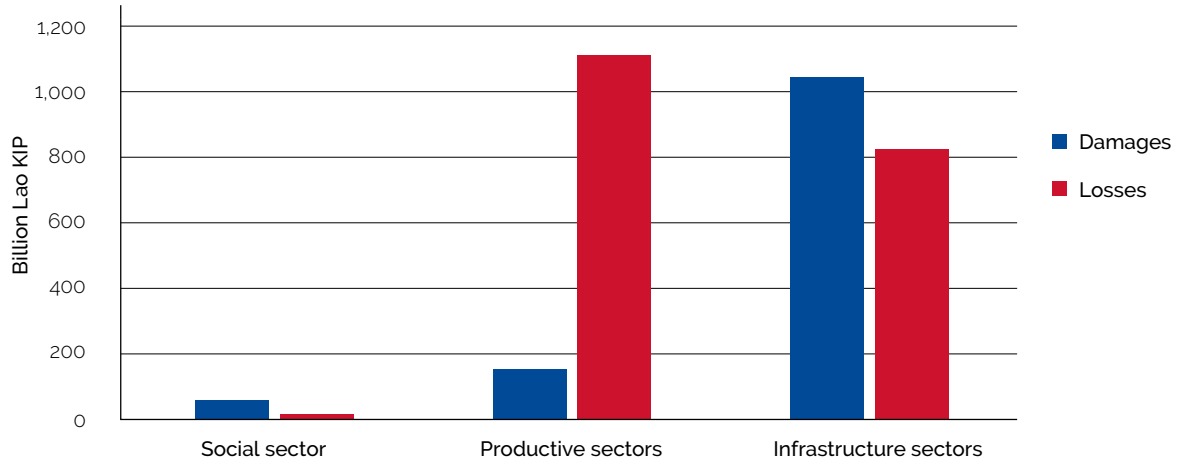
Source: Estimates based on data from the Government of Lao PDR.

Table 4 — Summary of Damage and Losses (billion Lao kip)

SECTORS	DAMAGE	LOSSES	TOTAL
Social sectors			
Housing and settlements	21.12	0.57	21.69
Education	18.73	1.68	20.41
Health and nutrition	8.58	3.32	11.89
Culture	10.11	0.25	10.36
Productive sectors			
Agriculture (crops, livestock, fisheries, forestry, irrigation)	139.80	1,087.60	1,227.30
Industry and commerce	0.80	2.99	3.78
Tourism	21.87	9.59	31.46
Infrastructure sectors			
Transport	822.02	785.80	1,607.82
Electricity	42.20	3.20	45.40
Water supply	50.96	19.02	69.98
Waterways	116.90	--	116.90
TOTAL	**1,253.10**	**1,914.02**	**3,166.99**
TOTAL (MILLION US$, APPROXIMATE)	**147**	**224.5**	**371.5**

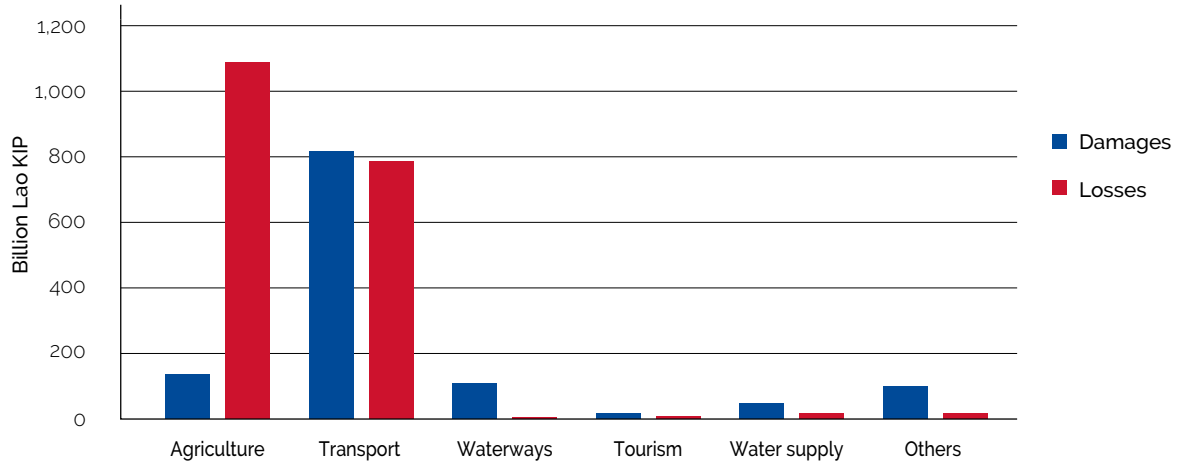
Source: Estimates based on Government of Lao PDR data.

Figure 3 — Effects by Sector Type



Source: Estimates based on Government of Lao PDR data.

Figure 4 — Damage and Losses by Sector



Source: Estimates based on Government of Lao PDR data.

ASSESSMENT OF MACROECONOMIC IMPACT

The overall cost to the economy of the floods was an estimated 3,166.9 billion Lao kip (US$371 million), or about 2.1 percent of GDP in 2018. Damage to physical infrastructure and assets amounted to 1,253.1 billion Lao kip, while production losses were valued at 1,914.02 billion Lao kip, as detailed in Table 4.[15]

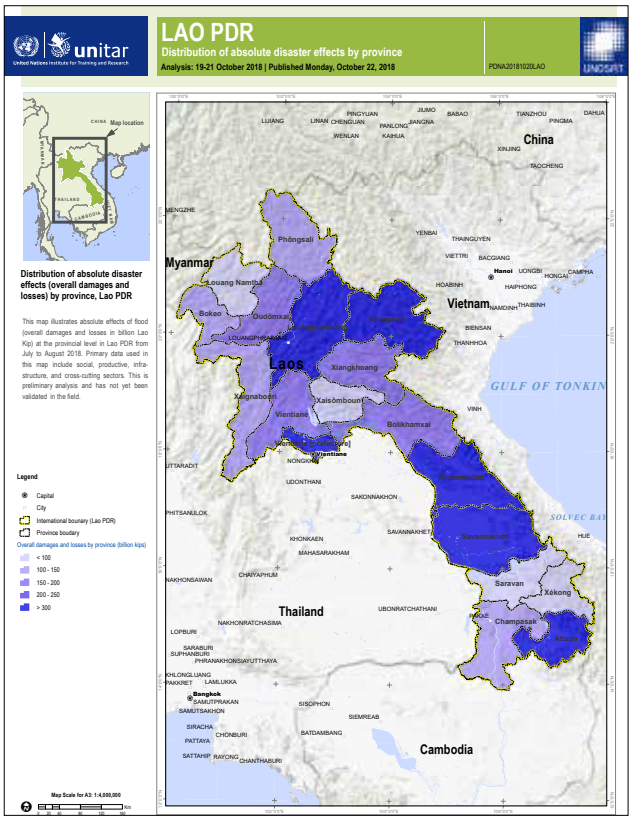
Although the disaster affected the various economic sectors differently, agriculture and transport were the most heavily affected, indicating that the economic impacts of the event were felt most strongly in the productive and infrastructure sectors (see Figure 3). Of the productive sectors, agriculture—including the sub-sectors of crops, fisheries, livestock, forestry, and irrigation—suffered the greatest losses, amounting to 57 percent of total losses, while damage to the sector accounted for only 11 percent of the overall damage. Among the infrastructure sectors, transport—including roads, bridges, transport services, and government buildings—accounted for 65.6 percent of the overall damage and 40 percent of production losses. The waterways sector sustained the next highest damage after transport and agriculture (see Figure 4).

Among the social sectors, housing incurred the most damage, accounting for 21.7 billion Lao kip, or 1.7 percent of the overall damage. Damage to education was estimated at 20.4 billion Lao kip, or 1.5 percent. Damage and losses to the other social sectors of health and culture were around 11.9 billion Lao kip (0.7 percent of the overall damage) and 10.4 billion Lao kip (0.8 percent), respectively, with few or no production losses.

In geographical terms, Vientiane Capital, Huaphanh, Khammuane, and Attapeu provinces were worst affected by the disaster, as illustrated in Figure 5 and Figure 6.

With regard to per capita impact, Attapeu and Huaphanh were the most affected (see Figure 7 and 8). The measure is derived using the country's total population and the total disaster effects by province.

Figure 5 — Distribution of Disaster Effects by Province

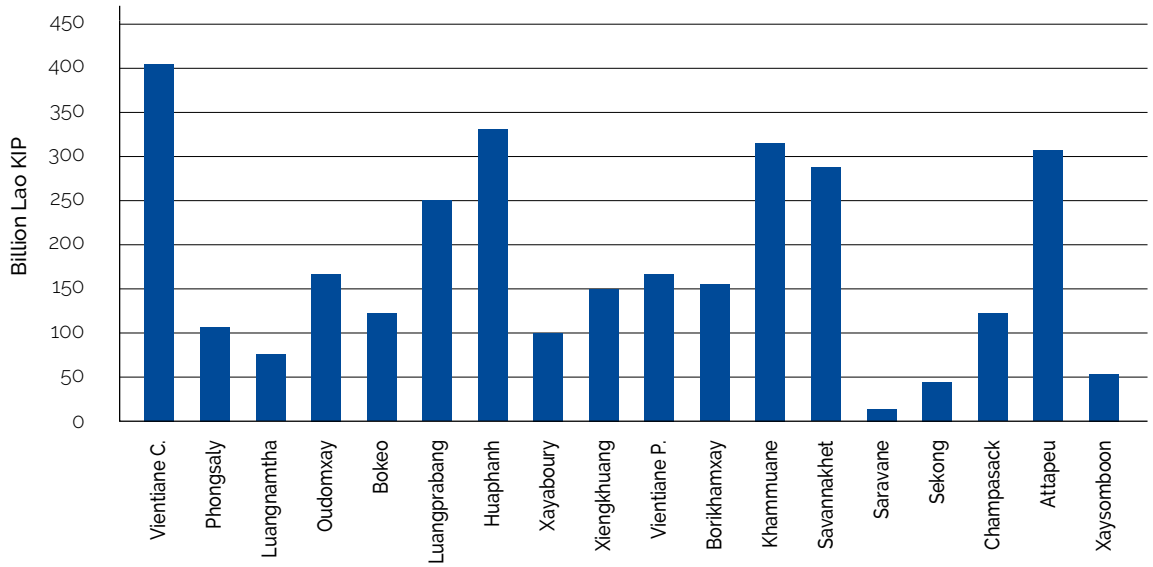


Source: UNITAR, Lao PDR, 22 October 2018.

The public domain was heavily affected in terms of both damage and losses (see Figure 9). Production losses in the private domain, which were greater than in the public, were driven mainly by the loss of income incurred by farmers, persons involved in small and medium-sized enterprises, and those providing services in the tourism sector. Public domain losses were driven mainly by activity in the infrastructure sectors resulting from quick response to reduce risk and from the repair of waterways, electricity, roads, and bridges and the removal of landslides. Private damage was fueled by the effects of the disaster in the housing sector and public damage by its effects on roads and bridges in the transport sector.

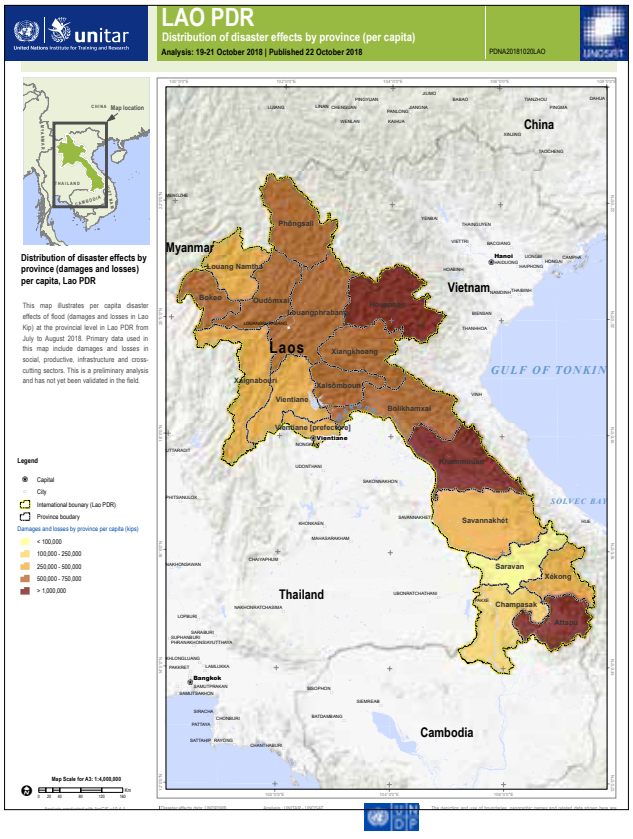
15. Damage and losses identified in the cross-cutting issues have been included in the appropriate sectors of the economy that address the respective activities.

Figure 6 — Overall Damage and Losses by Province



Source: Estimates based on Government of Lao PDR data.

Figure 7 — Disaster Effects Per Capita



Source: UNITAR, Lao PDR, 22 October 2018.

MACROECONOMIC RECOVERY AND RECONSTRUCTION NEEDS

The needs for resources for flood recovery in the short, medium, and long terms are considerable, totaling an estimated 4,422.86 billion Lao kip. The cost of recovery is greatest in the infrastructure sectors (55.1 percent), followed by the cross-cutting issues (28 percent). The latter costs are mostly related to restoring the livelihoods of the affected people. The short- and medium-term needs together account for about 54.7 percent of the total resources required for recovery, and these mainly include support to restore the livelihoods of affected people and the recovery of severely affected sectors, such as agriculture and transport (repair of roads, bridges, and waterways), while long-term needs relate mostly to upgrading infrastructure and the clearance of unexploded ordnance (UXO) (see Figure 10, 11 and Table 5).

MACROECONOMIC BACKGROUND AND IMPACT ASSESSMENT

Lao PDR's economic performance has decelerated in recent years but remains robust. Real GDP growth decreased slightly to 6.9 percent in 2017 from 7 percent in 2016 and 7.3 percent in 2015. The nominal GDP (GDP at current prices) was estimated at 140,749 billion Lao kip in 2017, and the GDP per capita was at 20 million Lao kip (approximately US$2,472).[16] The economy has grown steadily over the past two decades, with an average growth rate of 7.6 percent between 1997 and 2017.

The country has also seen a significant decline in poverty, falling from 46 percent of the population in 1993 to about 23.2 percent in 2013; it is currently estimated at 19 percent.[17] The recent expansion of labor-intensive industries (agriculture, manufacturing, and services) and robust remittance inflows are expected to continue to support poverty reduction.

The impact of the floods on real sector performance and overall macroeconomic aggregates in 2018 is expected to be limited, as the key economic sectors driving growth were not affected. The larger share of the GDP in Lao PDR is very much dependent on the industry sector (energy and mining, manufacturing, and construction) and the service sector (wholesale and retail trade, tourism, financial, and other services), which were not significantly affected by the floods.

With particular regard to industry, the sector covered 35.2 percent of GDP in 2017 and contributed to the overall economic growth rate by 3.9 percent. Key contributors to the growth were electricity expansion (including the Hongsa Lignite Power Plant) and 11 small hydropower projects. The ongoing construction of the railways between Lao PDR and China railway also contributed to the industrial sector growth rate. None of these activities reported effects from the 2018 floods.

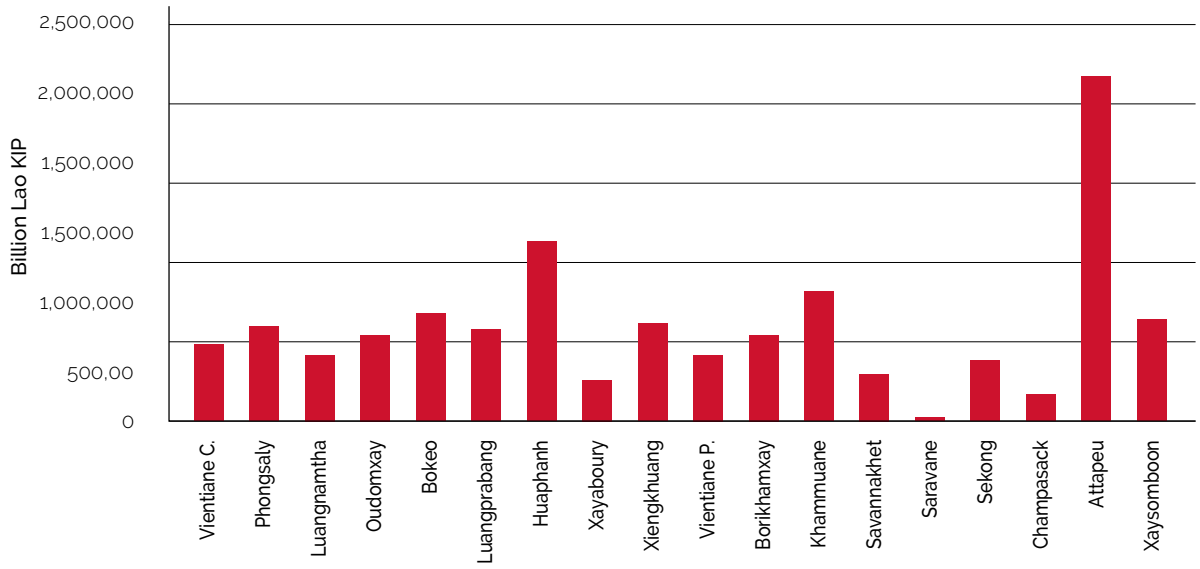
In 2017, services grew by 4.5 percent, decreasing slightly from 4.6 percent in 2016 and resulting in services representing 39.4 percent of GDP and contributing to overall economic growth by 1.8 percentage point (see Figure 12). As compared to several years prior, the key components of GDP have been shifting gradually from production-based to service-based, with service sub-sectors on the rise; these include financial and insurance activities, wholesale and retail trade, transportation and storage, professional, scientific, and technical activities, and others. Of those reporting disruption to activities from the floods, the main one was wholesale and retail trade. While most other significant service sub-sectors did not report disruptions, the losses to wholesale and retail trade and to tourism, estimated at 2.99 billion and 12.87 billion Lao kip, respectively, were enough to affect sector output.

Among the productive sectors, the floods mostly affected agriculture, which accounted for 16.2 percent of GDP in 2017, with production output rising by 2.87 percent, and contributed to the overall economic growth rate by 0.46 percent. Of this, agricultural production grew at 3.73 percent compared to the previous year, while livestock products, fisheries, forestry, and logging grew at 5.91 percent, 3.20 percent, and –11.31 percent, respectively. The total losses in the sector, which were mainly incurred in the private domain, amounted to 1,103.4 billion Lao kip and, therefore, had a negative impact on the projected 2018 GDP. The assessment of the agriculture sector indicates that, unless quick action is taken to repair irrigation schemes and provide support for the farmers, the next season may be affected, suggesting 2019 GDP may be affected, as well, at least in the first and second quarters.

16. Bank of Lao PDR, Annual Economic Report, 2018.

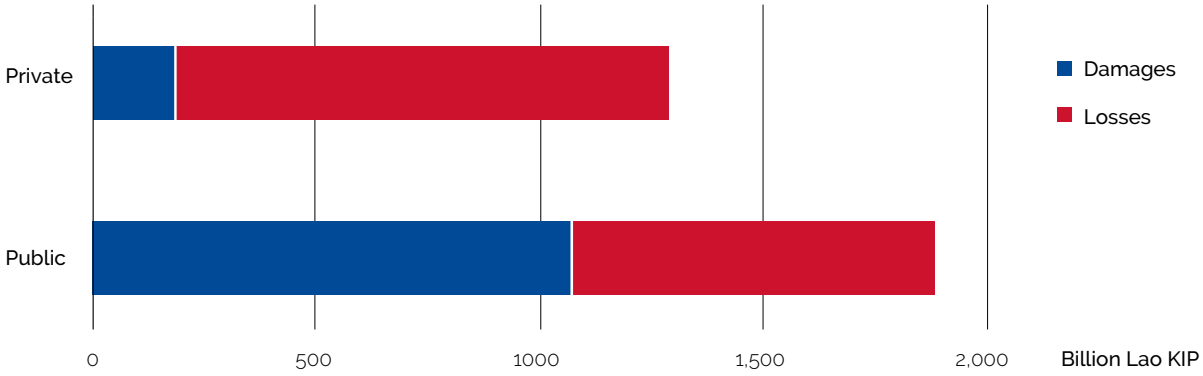
17. World Bank, Lao Economic Monitor, June 2018.

Figure 8 — Damage and Losses Per Capita by Province



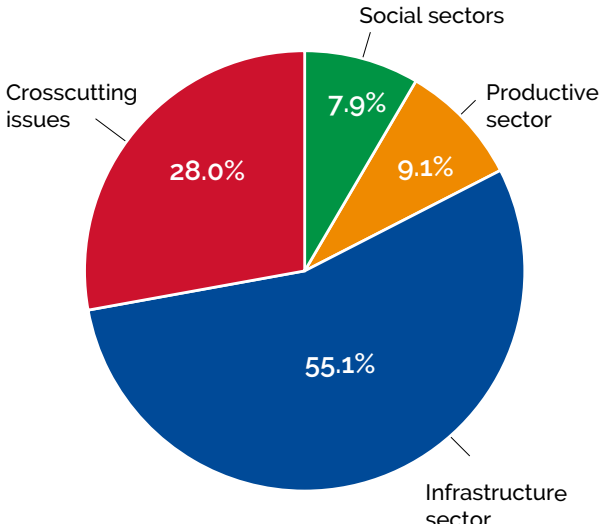
Source: Estimates based on Lao PDR data.

Figure 9 — Disaster Effects by Ownership



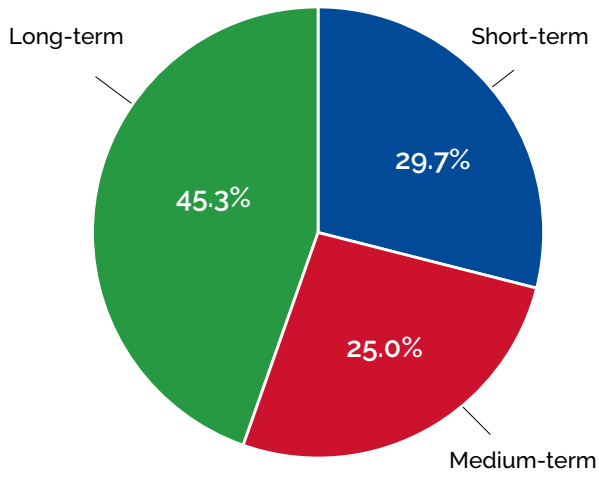
Source: Estimates based on Lao PDR data.

Figure 10 — Recovery Needs by Sector (percentage of total)



Source: Estimates based on data from the Government of Lao PDR.

Figure 11 — Recovery Needs by Urgency (percentage of total)



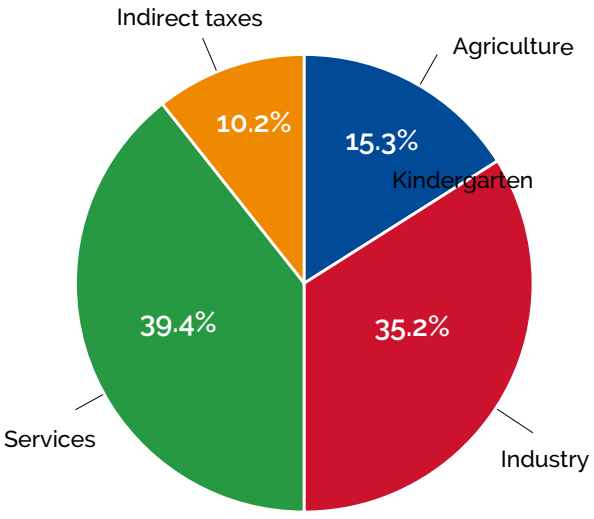
Source: Estimates based on data from the Government of Lao PDR.

Table 5 — Short-, Medium-, and Long-Term Needs for Disaster Recovery (billion Lao kip)

	SHORT-TERM	MEDIUM-TERM	LONG-TERM	TOTAL NEEDS
SOCIAL SECTORS	234	79	37	350
Housing and settlements	29.00	44.60	--	73.60
Education	168.90	18.90	9.80	197.60
Health and nutrition	27.31	--	--	27.31
Culture	8.57	15.46	27.56	51.59
PRODUCTIVE SECTORS	**264**	**108**	**29**	**400**
Agriculture (crops, livestock, fisheries, forestry, irrigation)	231.50	97.00	28.80	357.30
Tourism	30.75	7.37	0.23	38.35
Industry and commerce	1.50	3.20		4.70
INFRASTRUCTURE SECTORS	**687**	**742**	**1,006**	**2,435**
Transport	582.13	658.56	833.94	2,074.63
Urban and Rural Water Supply	30.91	19.65	17.96	68.52
Waterways	32.00	63.60	154.40	250.00
Electricity	42.20	--	--	42.20
CROSS-CUTTING ISSUES	**129**	**179**	**929**	**1,237**
Disaster Risk Management; environment and climate change	17.25	106.11	52.64	176.00
Governance	11.69	0.00	61.02	72.71
Human development (employment and livelihoods, gender, disability, and child protection)	73.10	73.20	54.60	200.90
Unexploded Ordinance (UXO)	26.61		760.79	787.40
TOTAL	**1,313**	**1,108**	**2,002**	**4,423**
TOTAL (IN US$ MILLION, APPROXIMATE)	**154**	**130**	**235**	**520**

Source: Estimates based on Government of Lao PDR data.

Figure 12 — Composition of Real GDP in 2017 (percentage of total GDP)



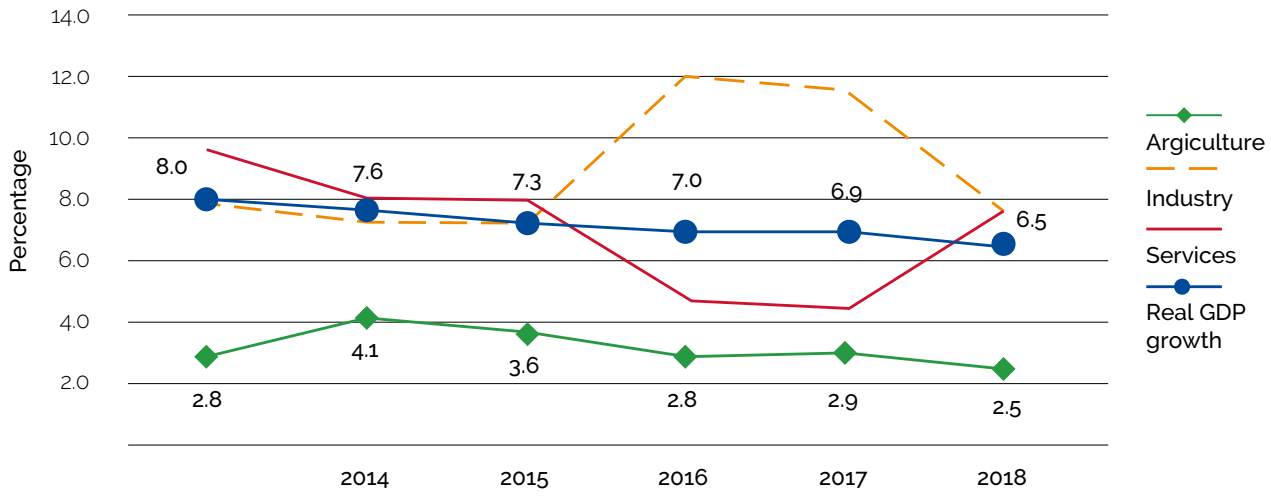
Source: Estimates based on Government of Lao PDR data.

Consequently, real GDP growth is expected to decline to 6.5 percent in 2018 from the initially projected 6.7 percent, due to the floods (Figure 13).[18] This slight decline (–0.2 percentage points) reflects the low impact on the economic output of the affected sectors that are the main drivers of the economy, rather than the impact of the scale of the disaster on human lives, private infrastructure, and assets or livelihoods. Even so, although negligible, the decline will result in a continued slowing of growth.

The second major area of the economy affected by the floods was infrastructure. Transport, including roads, bridges, and government buildings, suffered significant damage and resultant losses, amounting in total to 785.8 billion Lao kip. These losses were shared by the private and public domains, with the larger share—some 93 percent—incurred by the latter.

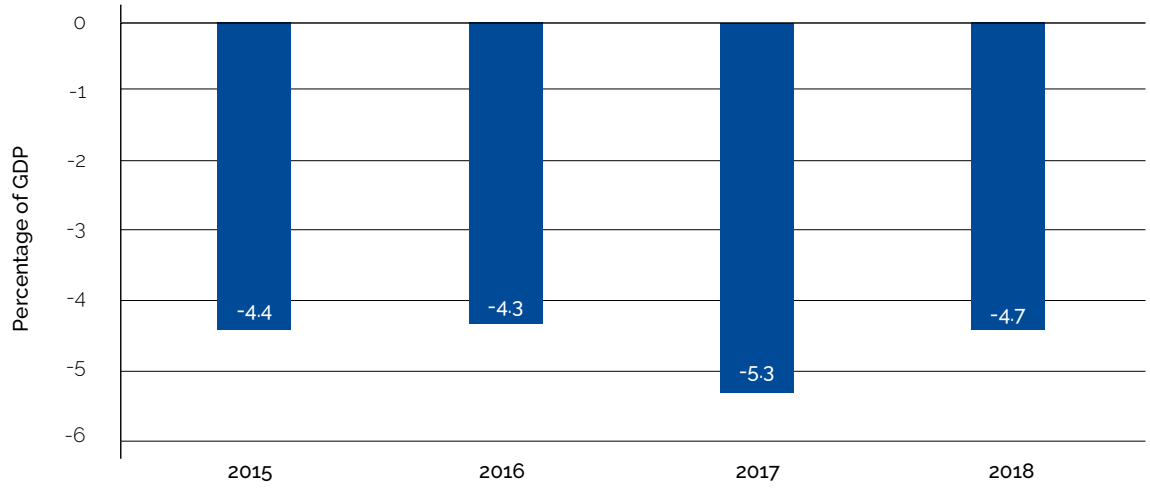
18. Based on GDP estimates by the Lao Statistics Bureau.

Figure 13 — Lao PDR's Real GDP Growth by Year



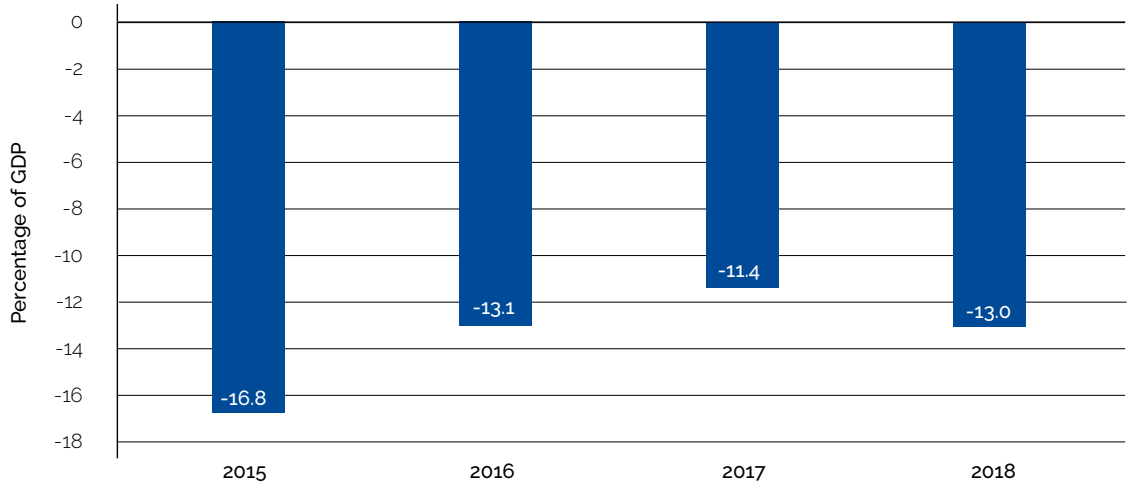
Source: Estimates based on Government of Lao PDR data.

Figure 14 — Fiscal Position by Year



Source: Estimates based on Lao PDR data.

Figure 15 — Disaster Impacts on Current Account Balance



Source: Estimates based on Lao PDR data.

While the Government of Lao PDR will continue on the path of fiscal consolidation, it is, in response to the floods, reprioritizing expenditure toward the flood-affected regions and providing tax exemptions to the affected businesses, which is expected to result in a budget deficit of 4.7 percent of GDP. Based on data provided by the Ministry of Finance (MOF), flood-related fiscal losses are pegged at 0.4 percentage points of GDP in 2018 due to actions taken by the government to mitigate the impact of the flood. If these fiscal costs are stripped out of the budget, fiscal deficit would fall to 4.3 percent of GDP in 2018 rather than a deficit of 4.7 percent of GDP which is expected be the 2018 fiscal outturn with the flood (see Figure 14). The impact of the 2018 flood will adversely affect the fiscal balance in 2019 as well due to the ongoing reconstruction efforts throughout next year. Specifically, in 2019, the fiscal deficit is expected to be 0.9 percentage points higher. That is, a deficit of 4.3 percent under flood scenario versus a deficit of 3.6 percent under the no-flood scenario for 2019.

Moreover, it is expected that assistance to the flood-affected regions in 2019, through tax exemptions and reprioritization of expenditure toward them of 500 billion Lao kip (1.5 percent of total expenditure) for medium-term recovery, will continue.

The disruptions to economic activity caused by the 2018 floods are not expected to have a significant impact on the balance of payments. Overall, balance of payments registered a surplus in 2017. The current account recorded a deficit of US$1,193 million, while the capital account recorded a surplus of US$21.8 million and the financial account (net) marked an inflow of US$2,155.6 million. As a result, overall balance registered a surplus of US$201 million, and foreign reserve picked up from US$815 million in 2016 to US$1,016 million in 2017 (around 2.5 months of import cover).[19] The main driver of the change in the current account balance due to the floods would be the import requirements of the transport sector linked to reconstruction and general consumption for other sectors. Consequently, the current account deficit is expected to widen slightly, to about 13 percent in 2018 (see Figure 15).

19. World Bank Staff Estimates. Excludes imports associated with large resource projects.

Photo credit: UNFPA

Sanamxay, Attapeu, August-September 2018.

Disaster-affected family in Sanamxay, Attapeu, August-September 2018.

Photo credit: UNFPA

HUMAN DEVELOPMENT IMPACTS

Employment and Livelihoods, Gender, Disability, and Child Protection

HUMAN DEVELOPMENT SUMMARY

The floods have had serious implications for people and society.

EMPLOYMENT AND LIVELIHOODS

Among those affected in the agriculture sector have been landless laborers, who might have lost assets or crops as well as employment opportunities, including for the 2019 dry season. In the informal sector, some 65,000 workers have been affected. "Own-account" workers in the industry and commerce sub-sector—that is, those who are self-employed or engaged in partnerships with no employees—have lost income for periods ranging from two weeks to three months. Family food consumption, health, and education expenditures have been significantly reduced. One potential consequence of the loss of livelihoods is out migration, either temporary or long-term. Almost 60 percent of those who migrate for work are women, so the out migration of workers may create vulnerable situations for those left behind. Those who lost their livelihoods will have incurred debts, which, in light of limited safety nets, can have serious impacts. To mitigate the adverse impacts, the restoration of lost employment and livelihoods is urgent, focusing on the most vulnerable and socially disadvantaged groups, through the provision of agricultural inputs and tools, cash- or food-for-work for those rendered unemployed, appropriate financing mechanisms for small- and medium-sized enterprises (SMEs) to kickstart business, and skills training for alternative livelihoods.

GENDER, DISABILITY, AND CHILD PROTECTION

The floods compounded and exacerbated to differing degrees the preexisting inequalities faced by women, children, the elderly, people with disabilities, and other marginalized groups in Lao PDR. The floods also exacerbated the risks of gender-based violence by leading to family separations, the breakdown of community protection systems, residence at overcrowded camps with lack of security personnel to protect vulnerable groups, lack of diverse foods, electricity, and water in many affected areas, and many other factors. Significant psychosocial suffering of vulnerable children and families has been detected in all disaster-affected provinces, demanding response to the psychosocial needs and trauma of children and their caregivers, as well as women and men. The recovery strategy defines a number of immediate, short-term recovery needs, including for the establishment and/or restoration of mechanisms that meet the specific needs of women, children, and people with disabilities. These short-term recovery needs are complemented by phased medium- and long-term needs aimed at building the resilience of social protection systems and ensuring that women, children, people of diverse gender identities, people with disabilities, and other marginalized groups are able to affect the Disaster Risk Management (DRM) decisions that affect their lives.

HUMAN DEVELOPMENT BACKGROUND

Employment and Livelihoods

The 2017 Lao PDR Labor Force Survey20 indicates 69 percent of the country's total population, then at 6.9 million, were of working age (15 years and above). The share of working-age population was 75.4 percent in urban areas and 66 percent in rural areas because of the greater number of cohorts below age 15 in the rural areas. Women accounted for a little more than 50 percent of the working-age population in both urban and rural areas. Table 6 shows key labor indicators in Lao PDR.

Out of 1.8 million employed persons, 1.5 million were estimated to be in informal employment in 2017. Own-account workers accounted for 33.5 percent in informal employment. More than half a million persons worked in agriculture, forestry, and fishing, followed by wholesale and retail trade and public administration and defense. Contributing family workers (without regular wages) accounted for the biggest share of employment at 38.3 percent, followed by employees and own-account workers. Women were more likely to be contributing family workers than men, while men were more likely to be employees.

Of total employment, the formal sector accounted for 26.5 percent of workers, with 35.2 percent in the informal sector and 38.3 percent in households. Women were more likely than men to be informally employed in all provinces, except Luangprabang. The gender gap in the informal employment rate was highest in Sekong and Attapeu. An estimated 127,000 persons were living in other countries, almost 60 percent of them women. A large majority were abroad for job-related reasons and were sending cash and/or goods back home.

The average gross monthly income of employees, including cash and in-kind payments and incomes from secondary jobs, was 2.5 million Lao kip, and the median was 1.8 million Lao kip. A notable gender gap resulted in female employees earning, on average, 0.5 million Lao kip less per month than men. The range of income most frequently earned by women was from 1 million to 1.5 million Lao kip (32.1 percent), while for men it was from 2 million to 2.5 million Lao kip (24.5 percent). Overall, women earned significantly less than men, with an estimated gross national income per capita of US$5,354 for women, in comparison to US$6,789 for men.[21] Employed women were more likely to be in management and professional occupations than men. Women were also more likely to be service and sales workers than men, while the share of skilled agricultural workers, both male and female, stood at around 41 percent of those employed.

As of 2017, only 0.8 million of the working population of approximately 4.8 million were covered by a social protection scheme. Of these, 72 percent were with the National Social Security Fund and 21 percent with the National Health Insurance Fund. Of those with benefits (259,000), the majority mainly had health insurance coverage, followed by maternity benefits and survivors' pension benefits.[22]

Gender

Lao PDR ranks 138th out of 188 on the Human Development Index, with a Gender Development Index of 0.934. While the country has made significant progress in gender equality, inequalities persist, particularly in development areas.

20. Lao Statistics Bureau, 2017 Lao PDR Labor Force Survey, June 2018.

21. United Nations Development Programme, Human Development Indices and Indicators Statistical Update, 2018.

22. Ibid.

Table 6 — Key Labor Market Indicators in Lao PDR, 2017

Working-age population	4,758,031
Labor force	1,940,230
Labor force participation rate (percent)	40.8
Out of labor force	2,817,801
Employed	1,757,733
Unemployed	182,497
Unemployment rate (percent)	9.4
Own-use production worker	2,455,328
Composite rate of labor underutilization (percent)	25.8
Youth unemployment rate, ages 15–24 (percent)	18.2
Share of wage workers in total employment (percent)	32.4
Average gross monthly income of employees (Lao kip)	2,481,000

Source: Lao PDR Statistics Bureau, 2017 Lao PDR Labor Force Survey, June 2018.

Gender Inequalities

Gender inequalities are prevalent in Lao PDR in formal and informal employment, access to financial services, and social and political participation. As a key example, although 25 percent of National Assembly members were female in 2017, barriers to women's leadership remained at provincial and local levels, where women constituted only 6 percent of district mayors and 2.6 percent of village chiefs.[23] Gender equality is promoted by the National Commission for the Advancement of Women, Mothers, and Children (NCAWMC), the National Assembly Women's Parliamentary Caucus, and the Lao Women's Union (LWU). With regard to employment—in addition to the disparities in the labor market mentioned above—women devote more time to domestic and productive work than men, spending 150 minutes per day on domestic and unpaid care work, compared to 36 minutes spent by men.24 Moreover, gender inequalities are compounded by intersections with other marginalized identities:

- **Ethnic minorities:** Ethnic minority women often do not benefit from protective laws targeting women's rights because they lack access to services and customary law.[25] Language and cultural barriers limit this group's access to education and income-generating activities.
- **LGBTQI:** LGBTQI persons face barriers to attaining education and employment and face stigma and discrimination. The access of LGBTQI persons with disabilities to services is further hampered by a lack of understanding of their identity, needs, and the particular forms of discrimination they face in their communities.[26]
- **People with disabilities:** How disability is experienced varies widely across gender, age, ethnicity, socioeconomic background, and sexual orientation.[27] Women with disabilities report facing more stigma and harassment than men with disabilities, as well as significant barriers to obtaining services, particularly in rural areas.

23. Lao PDR, Report to CEDAW, 2017.

24. UN Women, Progress of the World's Women 2015–2016: Transforming Economies, Realizing Rights, 2016.

25. CARE International, Promoting Women's Economic Empowerment with Ethnic Groups in the Mekong: Laos Case Study Report, 2015.

26. USAID, Lao PDR Gender Analysis on Disability, 2018.

27. Ibid.

Gender-Based Violence (GBV)

GBV is a serious public health problem in Lao PDR. Violence comes in the forms of physical, sexual, and controlling behaviors. A 2014 study reported that among ever-partnered women, 30.3 percent had experienced physical, sexual, and/or emotional violence. Physical violence had been experienced by 11.6 percent of ever-partnered women in their lifetimes and 4 percent in the previous 12 months, while 7.2 percent reported experiencing sexual violence in their lifetimes and 3.1 percent in the previous 12 months.[28] Also among ever-partnered women, 34.8 percent reported controlling behaviors by partners. Violence against women (VAW) was accepted to a certain extent, with 29.4 percent of women reportedly believing wives must not refuse sex and 44.9 percent agreeing a husband could hit his wife if she were unfaithful. Gender norms and roles were seen as a cause of VAW—for example, intimate partner violence might be prompted by alcohol abuse, infidelity, and financial difficulties in the household.

Among women who encountered intimate partner violence (IPV), embarrassment and stigma prevented 43.2 percent from reporting the incidents, and less than 30 percent sought help from official agencies or others. Coordination is lacking among sectors providing services for GBV survivors and, therefore, no integrated data collection mechanism exists for GBV cases. Under the law on civil procedure in Lao PDR, family disputes are handled by a village mediation unit (VMU). Only one LWU-managed shelter is available nationwide (in Vientiane Capital), and, while LWU provides counseling units in most provinces and districts, an assessment of its capacity to provide high-quality services to the flood victims is urgently needed.

PEOPLE WITH DISABILITIES

Information on people with disabilities in Lao PDR is limited. The prevalence rate for disabilities is reported to be 2.8 percent, with equal prevalence between males and females. The rate is slightly higher in rural areas without roads (3.3 percent), and it increases markedly with age, with 19 percent of women and 17 percent of men over the age of 60 having disabilities.[29] In addition to the physical challenges, persons with disabilities also face stigma and discrimination.

CHILD PROTECTION

In Lao PDR, a national legal framework to address violence against children was established through the Law on Preventing and Combating Violence against Women and Violence against Children (2015). The child protection program in Lao PDR includes government and partner interventions to address violence, abuse, neglect, and low birth registration. Only 73 percent of children are registered at birth, while 49 percent do not have birth certificates.[30] One in six children in Lao PDR experiences at least one form of physical violence before the age of 18, while many experience some form of sexual abuse. Most children do not know where to report violence and seek no services.[31]

28. National Commission for the Advancement of Women and Lao Statistics Bureau, Lao National Survey on Women's Health and Life Experiences 2014: A Study on Violence Against Women, 2014.
29. Ministry of Health and Lao Statistics Bureau, 2015. The reliability of this information is questionable, given the stark contrast with data from the World Health Organization (WHO), which has found 18.9 percent of the population of Southeast Asia has disabilities.
30. Lao Statistics Bureau, Lao Social Indicator Survey II 2017: Survey Findings Report (Vientiane, Lao PDR: Lao Statistics Bureau and UNICEF, 2018).
31. National Commission for Mothers and Children, Lao Statistics Bureau, and UNICEF Lao PDR. National Violence against Children Survey in Lao PDR: Preliminary Report (Lao PDR: NCMC, 2016).

ASSESSMENT OF DISASTER EFFECTS ON HUMAN DEVELOPMENT

Disaster Impacts on Employment and Livelihoods

While the number of workers affected by the floods may be difficult to estimate, the floods' impact on employment and livelihoods can be said to have mostly affected the agriculture, commerce and industry, and tourism sectors. Because of the high incidence of labor in the informal sector (83 percent), a conservative estimate is that at least half of the affected households include an own-account worker or contributing family worker. This translates to at least 65,000 informal workers affected by the floods. Relatedly, own-account workers in the industry and commerce sector have lost income for periods ranging from two weeks to three months (see the industry and commerce sector report), with resulting significant reductions in family food consumption and health and education expenditures.

In the agriculture sector, the destruction of farms and microenterprises has not only resulted in the loss of individual income but has affected dependent family members, as well. According to the Labour Force Survey, common coping mechanisms when there is a shortfall in income are reduction in household expenditures (29.8 percent); selling of property or livestock (7.1 percent); and assistance from friends or relatives (4.1 percent). Reduction in household expenditures is the coping mechanism most often used in both urban and rural areas.[32]

Any reduction in the income-expenditure link will adversely affect the nutrition and health status in the areas affected, especially among the rural population, where some 14.2 percent are estimated to be food insecure. Agricultural workers unable to replant immediately for the next cropping season, for example, might consider migrating to seek employment. The majority of paddy rice farmers indicated more agricultural workers than usual were making migration plans this year because of the crop failure and loss of income. Most labor-related migration is domestic within Lao PDR and Thailand, especially for the central and southern provinces, and for these farmers, the most popular jobs are in the construction or industry sectors, with average remuneration of around 6,000–65,000 Lao kip per day—higher when working abroad. Overall, almost 60 percent of those who migrate for work are women.

Another burden to farmers who have lost their livelihoods is debt. According to estimates reported in the agriculture sector, 70 percent of households normally have debts at this time of the year, mostly for agricultural inputs that include seedlings, fertilizers, and pesticides, among others; for investment; for health care needs; and for school-related expenditures, such as uniforms and materials. The total destruction of crops or substantial reduction of the harvest will be an added financial burden to the farmer-borrowers who, most probably, will need to secure additional production loans. Since, as noted, only about 17 percent of the working-age population of Lao PDR are covered by a social protection scheme, social safety nets for the affected workers, particularly the poorer ones, are limited.

32. Lao Statistics Bureau, 2017 Lao PDR Labor Force Survey, 2018.

Gendered Impacts of the Floods

Although the effects have varied across provinces, key findings on the impacts of the floods show that men and women who previously were occupied with productive work and had sufficient income have been left with scarce resources to cope with the situation. In particular, the flooding affected women's access to services and resources. Women are primarily responsible for water collection, which means those in some internally displaced persons (IDP) camps have ended up spending a long time waiting in line for water. Furthermore, women in these camps lack privacy during bathing and toileting, especially during menstruation. The inaccessibility of bathrooms and toilets to people with disabilities adds to the responsibilities of the female relatives who care for them. In households, disaster can bring out disagreements over financial matters, which can trigger domestic violence, making women more vulnerable.

Female-headed households may face greater challenges than others in getting access to health, legal, and social services. The disaster has also compounded women's exclusion from decision making in IDP camps. The Village Development Committees, 90 percent of which are headed by men, maintain their large role in camp management, leaving most villagers, especially women, excluded from decision making on flood response and recovery. This situation has made the women feel that all decisions about their lives, their children, and their living conditions are dependent on others, such as camp managers and government authorities. They have not been consulted on camp management, shelter construction, or temporary housing.

In Vientiane Province, the floods suspended awareness raising and campaigning around equal distribution of work across gender roles and the designation of "Gender Equality Model Villages" by the Lao Women's Union. Under this campaign, villages and households received information, education, and communication (IEC) materials on gender equality, on the importance of facilitating women's access to village committees and meetings, and on ending violence against women. Flooding also cut off communications between the district- and village-level chapters of the Lao Women's Union.

Key psychosocial impacts of the dam collapse in Attepeu Province and the floods include increased concern and distress, which can take different forms for men and women. Women are mostly concerned about their children's security in the camps, and their fears include sexual assault, theft, trafficking, and illness, as well as the potential for disasters associated with fires. Men shared serious concerns regarding the safety of the new temporary shelters and lack of access to productive land, especially with a view toward the cold season. Both women and men are concerned about a lack of food and water, and they are afraid another flood will happen. Both reported losing sleep to stress and distress. Neither reported actively using coping strategies (except for the men who reported drinking alcohol as a coping mechanism), relying instead on the government to meet their needs. Some men who have access to transportation with friends or relatives have traveled outside the camps to find food, and some have worked with the company that built the dam to clear houses in affected villages.

Finally, the risk of GBV and sexual violence increases during displacement and emergency situations. Factors that contribute to the increased risk include family separation, breakdown of community protection systems, living at overcrowded camps that lack security personnel to protect the vulnerable groups, and lack of electricity in many affected areas, among many others. Risks of GBV have risen in IDP camps and temporary shelters in Sanamxay District because of camp conditions and management. The temporary shelter at Hadyao Village is overcrowded and provides no privacy for women or men. Male and female toilets are close together, and bathing areas are not private for either women or men. Sanamxay High School Camp has no separate men's and women's toilets or showers at all.

Disaster Impacts for Persons with Disabilities

IDPs with disabilities appear to be isolated and are likely excluded from decision making and other activities in the camps. Children and adult IDPs with disabilities are reported to be experiencing stigma and discrimination. Buildings in the Hadyao temporary camp are not accessible for people with mobility disabilities, meaning they are reliant on others to use toileting and bathing facilities. This is especially concerning in that, in Lao's rural areas, persons with disabilities and the elderly limit food and water intake and reduce the number of times they defecate so as not to be a burden on the (female) relatives they rely on for care, with negative repercussions for their hygiene and health. Women with disabilities report difficulty in remaining clean, especially during menstruation.[33] The children with disabilities who have have been identified in camps are not participating in child family services.

Disaster Impacts on Child Protection

Significant psychosocial suffering on the part of vulnerable children and families has been detected in all disaster-affected provinces. No systematic child protection mechanism is in place to ensure the safety of children, and no data are being collected on child protection. Anecdotal evidence suggests an urgent need to respond to the psychosocial needs and trauma of children and their caregivers. Limited financial and human resources pose challenges to providing professional mental health counseling, identifying child protection cases, and offering high-quality and timely social services to vulnerable children and their families. While six "child-friendly spaces" (CFSs) have been established in Sanamxay District for IDP children, the overall capacity of frontline workers and child protection stakeholders is low on account of their heavy workloads and high turnover and the relocation of populations to temporary shelters.

During and after emergencies, children without adequate parental care are exposed to child protection risks. In the aftermath of the floods, 58 orphans were identified in six of the worst-hit villages, and the collection of data on orphans is ongoing in another 13 affected villages in Attapeu Province. No data on children with disabilities are available. Improved community-based mechanisms are needed to monitor the status of children without adequate parental care.

RECOVERY STRATEGY AND NEEDS FOR HUMAN DEVELOPMENT

Employment and Livelihoods

To mitigate the impacts of the losses of employment and livelihoods caused by the floods, the top priority for recovery should be the rapid rebuilding of people's incomes and livelihoods, focusing on the most vulnerable and socially disadvantaged groups. The strategies in this area should look past the recovery period to grasp the chance to expand employment opportunities beyond agriculture. The short-term strategies for recovery could include the following:

- Immediate restoration of lost livelihoods and employment, particularly for those in agriculture (see the chapter on the agriculture sector)
- Provision of cash grants to capitalize those in the informal sector who have lost their microenterprises
- Prioritization in cash- or food-for-work programs and in the subsequent recovery programs, such as road repairs, of those who lost their livelihoods

In the medium to long terms, the creation of an enabling environment conducive to the growth of investments in both farm and non-farm businesses is necessary. The Lao PDR economy will need to generate more off-farm jobs to absorb the 96,000 annual entrants into the economy. In general, the government can do the following:

- Review present policies to create a more business-friendly environment—for example, by improving processes and simplifying transactions in terms of investment and business compliance through the imposition of clear and transparent fees, permits, and other legal requirements.
- Expand job-related or in-demand technical skills training that will enable a large proportion of the workforce (especially youth) who are trapped in lower-productivity farming work to move on to higher-paying technical jobs.

33. CARE International, Promoting Women's Economic Empowerment, 2015.

Gender, Disability, and Social Protection

The recovery strategy defines a number of ways to address immediate, short-term recovery needs, including the establishment and/or restoration of mechanisms that meet the specific needs of women, children, and people with disabilities. These short-term needs are complemented by phased medium- and long-term needs aimed at building the resilience of social protection systems and ensuring that women, children, people with disabilities, and other marginalized groups are able to influence the DRM decisions that affect their lives. Four elements that cut across all sectors form the foundation of the recovery strategy:

- Promoting the systematic collection, analysis, and use of sex, age, and disability disaggregated data (SADDD) and gender analysis for evidence-based programming in DRM
- Strengthening the capacity of line ministries, as well as dedicated civil society bodies on gender and disability rights, to engage in DRM, including in the defining of the recovery strategy
- Strengthening the resilience of systems, including GBV prevention, mitigation, and response systems and child protection systems, to disaster impacts
- Taking a transformative approach to DRM, including the transformation of gender norms and roles and the empowerment and equipping of women with climate-resilient livelihoods

HUMAN DEVELOPMENT METHODOLOGY

Employment and Livelihoods

The assessment in the area of employment and livelihoods draws on the latest labor statistics for Lao PDR, on the reports on various other sectors, such as agriculture and commerce and industry, and on information collected during field visits conducted by the Ministry of Labour and Social Welfare (MLSW) staff. Some rough estimations used the methods put forth by the relevant post-disaster needs assessment (PDNA) guidelines.

Gender, Disability, and Child Protection

The assessment relating to gender, disability, and child protection was based on a desk review of existing baseline documents and data collection from MLSW and the Lao Women's Union at the provincial and district levels. Because of limited human resources and time constraints, field assessments were only conducted in Attapeu (Sanamxay District) and Vientiane Province (Thaulacom District). Official data are not disaggregated by age, sex, people with disabilities, or ethnic minorities, and persons with disabilities were not part of the assessment teams or included in consultations or interviews during assessments. This should be noted for future PDNAs to ensure persons with disabilities are not excluded from recovery plans.

Table 7 — Recovery and Reconstruction Needs for Human Development

SUB-SECTOR	PROGRAM OR ACTIVITY	VALUE (BILLION LAO KIP)	RESPONSIBLE AGENCIES
Employment and livelihoods	• Immediate rebuilding of people's livelihoods and the revitalization of the local economy, focusing on the most vulnerable and socially disadvantaged groups, through the following: • Provision of agricultural inputs and tools • Provision of cash- or food-for-work for those rendered unemployed • Provision of skills training for alternative livelihoods • Revitalization of small and medium-sized enterprises and protection for them from future shocks from disasters • Provision of appropriate financing mechanisms for SMEs to kickstart business • Development of incentive scheme for increased insurance participation of SMEs • Strengthening of capacity in DRM among SMEs	To be covered by other sectors	MAF, MICT, MLSW, MOIC
	SHORT-TERM NEEDS (ONE YEAR)		
Gender	• Support for participation of women's organizations and disability rights organizations in the development of the recovery strategy • Support for the LWU to resume campaigning for changes in social norms around gender roles, promotion of women's participation in decision making, and the ending of violence against women • Mitigation of human trafficking risks by regulating the flow of people in and out of camps and informing women, men, and adolescent girls and boys about the risks of human trafficking • Provision of targeted interventions to keep older girls in school and of information to parents on the benefits of education for girls through women-friendly spaces;* seeking of opportunities to provide incentive to keep children in school • Adoption by village committees and camp management of a consultative process to engage women and men, including people with disabilities, in decision making and camp management • Conducting of a national household time-use study for in-depth analysis of the differential effects of the disaster on men and women • Provision of cash for small livelihood activities, such as fishing and small businesses, targeting especially female-headed households • Provision of cash-for-shelter to enable ethnic minority groups to construct houses according to their own traditions	41.6	LWU, MLSW, protection cluster, early recovery cluster
Gender-based violence	• Provision of GBV services for survivors and women and girls at risk, including case management, psychosocial counseling, medical services, and referral • Conducting of awareness sessions and a campaign for the community about GBV prevention and response in emergencies and how to get access to services • Building of the capacity of the Lao Women's Union to address GBV prevention and response in emergencies through training of trainers (ToT) • Improvement of GBV data collection mechanism through strengthened coordination among different sectors (health, psychosocial support, legal and justice, and safety and security) for providing comprehensive support to GBV survivors • Inclusionn of formal and informal support and response structures in GBV activities: • Inclusion of traditional mediators in GBV training and application of a survivor-centered approach • Inclusion in the GBV referral pathway of both formal and informal support structures	3.5	LWU, members of protection cluster

SUB-SECTOR	PROGRAM OR ACTIVITY	VALUE (BILLION LAO KIP)	RESPONSIBLE AGENCIES
Child protection	• Exploration of durable mechanism to sustain child- and youth-friendly activities organized by exiting child-friendly spaces,* which were operated in emergency mode in Sanamxay District, Attapeu Province, to provide continued psychosocial support to children under stress and help them build resilience • Identification of children without parental care through a systematic identification and registration mechanism; deployment of community-based alternative care supports for orphans and separated children, such as tracing families, identifying emergency foster care families, and providing basic psychosocial supports, while considering the needs for long-term care solutions • Support for government to develop guidelines for children without parental care in alignment with international norms and standards • Provision of capacity needs–matched trainings for frontline workers and local leaders on how to prevent, identify, and respond to child protection cases better, provide psychosocial supports, ensure the best interests of the child, and work with and for children • Establishment of referral systems that include children without adequate parental care and children with disabilities • Conducting of community awareness and sensitization campaigns on child protection, such as birth registration, how to identify child protection risks, child rights to protection, positive parenting, prevention of violence against children (VAC) and trafficking, and where to report to and seek services • Conducting of a mapping study of existing child protection systems and services to inform the development of an operational plan to strengthen the child protection system in Attapeu Province	2.2	MLSW, LWU, LYU, UNICEF, NGO partners
People with disabilities	• Inclusion in reconstruction of accessibility improvements for people with disabilities; provision of basic modifications to infrastructure in temporary camps to give access to people with disabilities and possibly building of accessible water supply, sanitation, and hygiene (WASH) infrastructure, including latrines and bathing spaces • Ensuring that all clusters use the Washington Group 6 Short Set of Questions on Disability during interviews and field visits • Inclusion of persons with disabilities on the assessment teams conducting interviews • Interviewing of persons with disabilities during the assessment phase so their needs can be taken into account in the post-disaster relief work	25.8	MLSW
MEDIUM-TERM NEEDS (TWO YEARS)			
Gender	• Provision of capacity development for the Lao Women's Union to collect SADDD, conduct assessments, including on GBV, and engage in decisions on disaster preparedness, response, and recovery • Engagement in advocacy for equipping the national gender machinery, including the Lao Women's Union, with adequate technical and financial resources to take part in recovery • Expansion of women's income-generating opportunities, including through capacity development, enhanced access to financial services, and learning exchange to ensure they are able to engage in climate change and disaster-resilient livelihoods	41.2	LWU, MLSW

SUB-SECTOR	PROGRAM OR ACTIVITY	VALUE (BILLION LAO KIP)	RESPONSIBLE AGENCIES
Gender-based violence	• Adoption of emergency GBV standard operating procedures and a referral system • Assessment of the capacity of LWU counseling units at district and provincial levels to provide services for the survivors and development of an action plan to strengthen GBV response and prevention that can be applied in both development and emergency contexts • Strengthening of LWU institutional capacity based on the assessment results and provision of training to relevant sectors, including health, justice, and security, to ensure multisectoral GBV response	6.3	LWU
Child protection	• Support for government to develop alternative care guidelines and standard operating procedures (SOPs) aligned to international standards for children without parental care • Development of and provision to reintegrated families of a systematic family reintegration and care support package; may include providing cash transfers to orphans, linking with other social protection/livelihoods programs, and ensuring access to other basic services (health, education, etc.), coupled with regular social work monitoring and follow up for reintegrated children • Strengthening of service delivery by providing in-service trainings focused on alternative care, case management, child placement, and provision of psychosocial supports, among others, and deployment of a professional social workforce able to implement the government alternative care program for highly vulnerable children • Transformation of the existing child-friendly spaces* into sustainable community-based platforms where regular child-and youth-friendly activities can be carried out in safe locations, such as community centers, schools, temples, and other appropriate locations, so children can take part in various psychosocial and child protection activities, and that might serve as mechanisms for receiving child protection cases and conducting community mobilization based on the needs of the children • Engagement in advocacy and awareness raising for the implementation of laws to protect children, in particular the Law and National Operational Plan to End Violence against Children in all settings and laws against child marriage and the abuse and trafficking of children	5.1	MLSW, LWU, LYU, UNICEF, NGO partners
People with disabilities	• Establishment of mechanisms to collect disaggregated data, including on disability, to ensure accurate baseline data are collected by a range of development partners in Lao PDR	20.6	MLSW
LONG-TERM NEEDS			
Gender	• Implementation of General Recommendation No. 37 on Disaster Risk Reduction and Climate Change Adaptation of the Convention of the Elimination of All Forms of Discrimination Against Women (CEDAW), including elements surrounding ensuring access to justice in disaster situations • Review, adaption, and revision of national disaster management structures, laws, and policies to ensure gender is effectively mainstreamed	27.4	LWU, MLSW

SUB-SECTOR	PROGRAM OR ACTIVITY	VALUE (BILLION LAO KIP)	RESPONSIBLE AGENCIES
Gender-based violence	• Development and strengthening of community-based support services at village and sub-district levels, in addition to the current village mediation units • Review, adaption, and revision of national disaster management structures, laws, and policies to integrate GBV prevention and response in emergencies, including stockpiling of a system of dignity kits as part of an emergency preparedness program	4.5	LWU and members of protection clusters
Child protection	• Review of the legal framework for reporting and responding to child protection cases in all settings, including child separation in emergencies • Setting up of a child protection information management system that allows timely data collection, analysis, referrals, and follow-up of child protection cases at all levels • Accreditation of social workers and para-social workers and regular monitoring of their performance to strengthen their ability to deliver high-quality child welfare services • Operationalizing of the community-based para-professionals (Child Protection Network) to strengthen community-based child protection mechanisms as part of the Disaster Risk Management efforts, including regular trainings, coordination meetings, provision of necessary job aid tools and mentoring, and linkage with local leaders and the professional social workforce for referrals • Support for relevant government bodies to implement the National Operational Plan to End Violence against Children in all settings • Empowerment of parents and children through evidence-based Communication for Development (C4D) campaigns on positive parenting and other child-friendly practices to promote family-based care and build resilience of children and families to prevent unnecessary family separation	2.7	MLSW, LWU, LYU, UNICEF, NGO partners
People with disabilities	• Application of the adage, "Nothing about us without us," which means persons with disabilities need to be included and have a "voice" • Taking of responsibility by all line ministries for assessing needs in the different sectors of persons with disabilities and ensuring their needs are addressed in the recovery phase • Review, adaptation, and revision of national disaster management structures, laws, and policies to ensure disability is mainstreamed rather than treated as an afterthought	20	MLSW
TOTAL NEEDS:		**200**	

* Women-friendly spaces are set up by the United Nations Population Fund to provide sanctuary and services to displaced women and girls following an emergency. Similarly, UNICEF provides child-friendly spaces to displaced children.

Note: DRM = Disaster Risk Management; GBV= Gender-based Violence LWU = Lao Women's Union; LYU = Lao Youth Union; MAF= Ministry of Agriculture and Forestry; MICT = Ministry of Information, Culture, and Tourism; MLSW = Ministry of Labour and Social Welfare; MOIC = Ministry of Industry and Commerce; NGO = nongovernmental organization; SME = Small and Medium-sized Enterprises; UNICEF = United Nations Children's Fund.

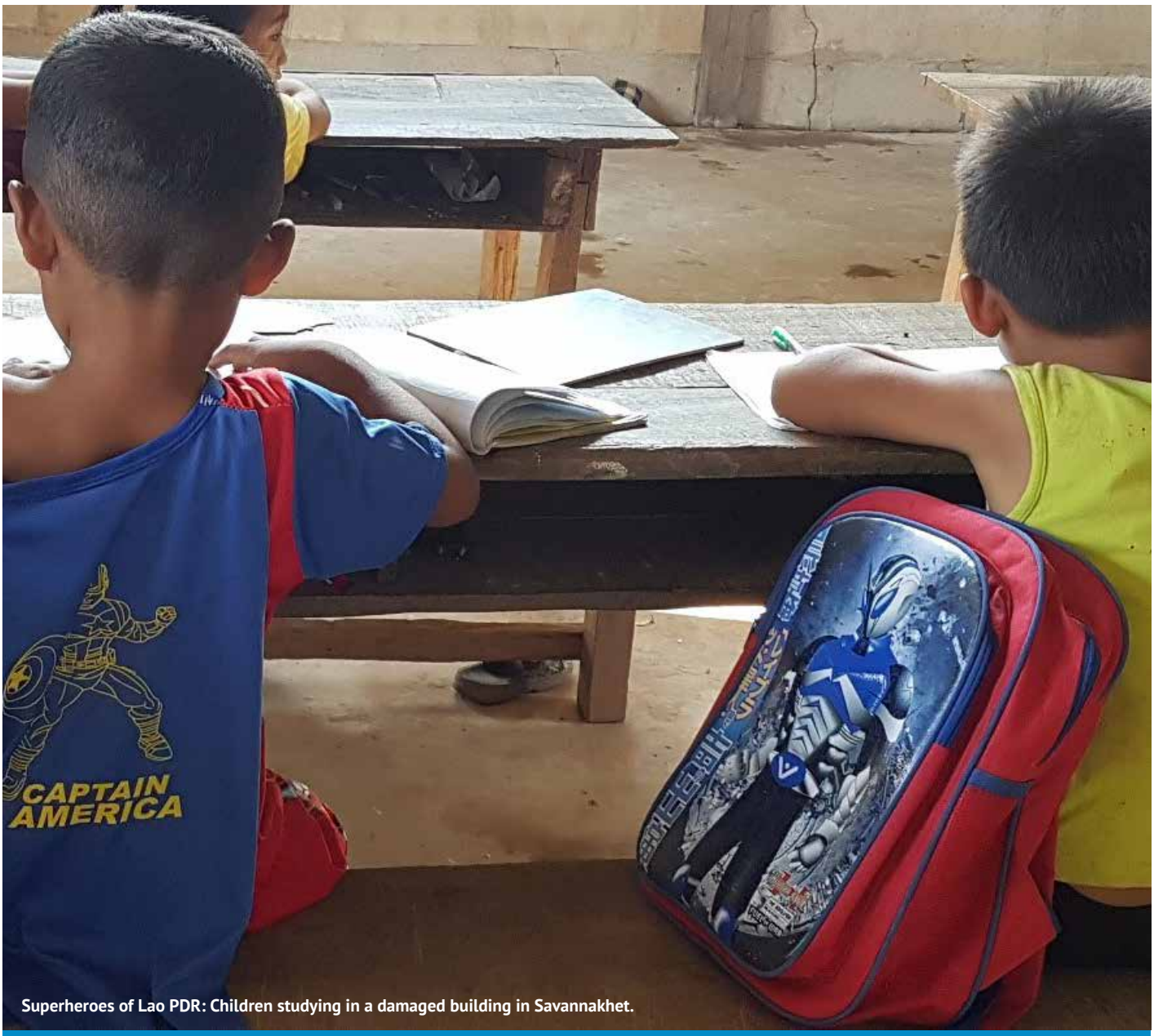


Photo credit: Tara I.M., Plan International Australia.

Superheroes of Lao PDR: Children studying in a damaged building in Savannakhet.

DAMAGE, LOSSES, AND NEEDS SOCIAL SECTORS

HOUSING AND SETTLEMENTS

HOUSING AND SETTLEMENTS SUMMARY

The floods caused severe damage to the housing and settlements sector in 11 provinces: Phongsaly, Luangnamtha, Oudomxay, Bokeo, Luangprabang, Xayaboury, Xiengkhuang, Borikhamxay, Savannakhet, Sekong, and Attapeu.[34] Although the events and magnitude of the damage differed from province to province (see Figure 16), the damage was highly concentrated in the southern province of Attapeu and the northern provinces of Oudomxay, Luangprabang, and Xiengkhuang. A total of 1,620 houses were assessed as destroyed, while 681 were damaged. Overall sector damage was estimated at 21.1 billion Lao kip. Losses were mainly incurred in the form of revenue losses and temporary shelter, totaling 574 million Lao kip (see Table 8).

An estimated total of 73.6 billion Lao kip is needed for recovery, with proposed activities to include risk-awareness raising and relocation of highly vulnerable communities, capacity building on the principle of "build back better," and reconstruction of damaged and destroyed houses. Also, the provision of everyday household items to affected people is urgently needed, as many lost a significant proportion of their assets in the disaster.

HOUSING AND SETTLEMENTS BACKGROUND

As indicated by Lao PDR's fourth population and housing census, conducted in 2015, the majority of houses in the rural areas of the country are constructed by dwellers themselves.[35] Most of the more robust houses are located in Vientiane Capital and four secondary towns (Luangprabang, Thakhek, Savannakhet, and Pakse), where the primary material used for construction is concrete or brick; in the rest of the country, wood is most commonly used for walls and flooring. In 7 out of the 11 affected provinces, zinc is the preferred roofing material. Table 9 summarizes the percentages of housing materials used for roofs, walls, and floors in the provinces assessed.

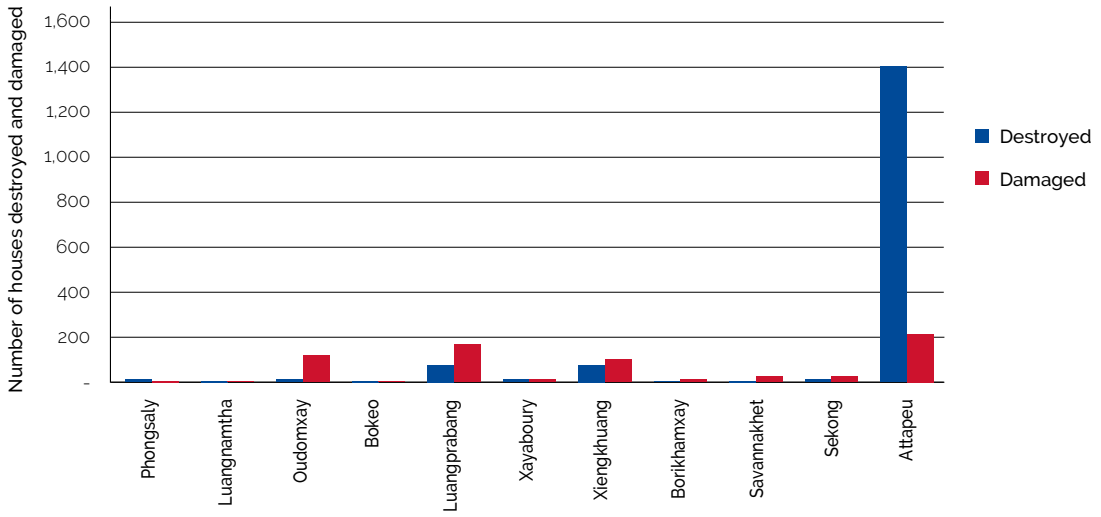
Despite the homogenization imposed by grouping, the construction materials differ significantly among the provinces. In Oudomxay, for example, light roofing materials represent the highest proportion (19.6 percent) of roofing materials used, compared to other provinces. Bamboo is the second most used material for walls (34.4 percent), although it is chosen by only 3.3 percent of the households in Xiengkhuang. Similarly, while ceramic is the main material used for flooring in Borikhamxay, it is the least preferred option in Sekong (8.6 percent).

The proportion of semi-permanent housing (made of grass, bamboo, and plywood) varies from a minimum of about 4.5 percent in Xiengkhuang to a maximum of about 15.7 percent in Attapeu. Most houses in the 11 affected provinces have zinc or, at times, grass or wooden roofs, and some combination of wooden or bamboo walls and wooden floors. Many wooden houses are raised between 2.5 and 3.0 meters above ground level and are supported by stilts. In some northern provinces, especially Xiengkhuang, these types of houses rest on stone or concrete foundations without being anchored (fixed) and are called "floating houses." These houses cater to households' need to move from one place to another to seek better livelihood opportunities.

34. The order in which the provinces are listed is based on a list and code provided in Lao Statistics Bureau, Ministry of Planning and Investment, Population and Housing Census 2015, https://www.lsb.gov.la/pdf/PHC-ENG-FNAL-WEB.pdf.

35. Ibid.

Figure 16 — Type of House Damage by Province



Source: UN-Habitat analysis based on provincial DPWT data.

Table 8 — Damage and Losses (billion Lao kip) to Housing and Settlements

SECTOR	DAMAGE			LOSSES		
	PUBLIC	PRIVATE	TOTAL DAMAGE	PUBLIC	PRIVATE	TOTAL LOSSES
Housing and settlements	--	21.1	21.1	0.17	0.40	0.57

Source: UN-Habitat analysis based on provincial DPWT data.

A greater homogeneity is seen in size, as most of the houses in the provinces assessed are between 26 and 75 square meters and have two or three rooms. The average house size in the 11 provinces is 59.5 square meters, ranging from a minimum of 49.5 square meters in Xayaboury to a maximum of 63.2 square meters in Oudomxay. The average household size in Lao PDR is 5.3 persons (according to the 2015 census), ranging from a minimum of 4.8 for Xayaboury to a maximum of 6.0 for Xiengkhuang. Most heads of household are male, with the female-headed households in the rural areas forming around 9 percent of all households across the country. Most the female-headed households are smaller than those headed by males, comprising one or two people.

In terms of land tenure, the majority of Lao PDR's households do not pay rent; 96 percent own their dwelling units, while around 2 percent declare not paying any kind of rent or do not report any occupancy status. The situation in the affected provinces is similar: more than 97 percent own their houses, while fewer than 2 percent live in places provided for free or as part of work arrangements. Only 1 percent (less than 6,500 households) declared paying rent at the time of the census.[36]

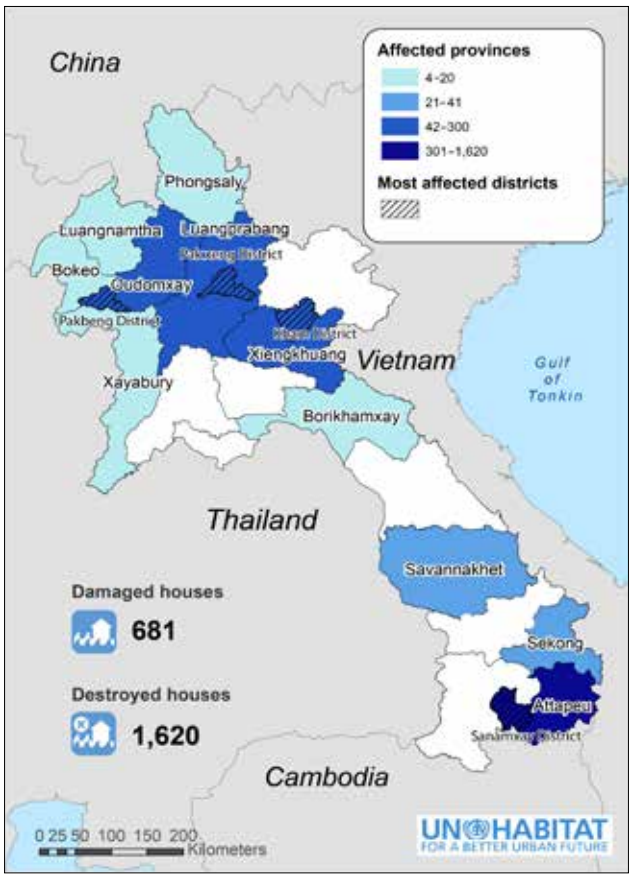
The institutional responsibilities of the housing and settlements sector at the central level lie with the Department of Housing and Urban Planning (DHUP) of the Ministry of Public Works and Transport (MPWT) and at the provincial level with the Department of Public Works and Transport (DPWT).

36. All the information used in this section was obtained from Lao Statistics Bureau, Population and Housing Census 2015.

ASSESSMENT OF DISASTER EFFECTS ON HOUSING AND SETTLEMENTS

The destruction wrought by the floods on housing and settlements was on an immense scale, as more than half of the country's provinces reported having suffered a negative impact on the sector. According to the information received, 11 out of the 18 provinces of Lao PDR experienced damage to housing and settlements. Attapeu Province in the south was the most affected, as it suffered 70 percent of the sector's losses, whereas the other severely affected provinces are located in the northern part of the country, as shown in the map in Figure 17. Final numbers of the destroyed and damaged houses, along with figures for damage and losses, are provided in Table 10.[37]

Figure 17 — Spatial Distribution of Housing and Settlement Damage



Source: UN-Habitat analysis based on provincial DPWT data.

Damage

Various factors contributed to a high level of destruction from the floods, amounting to 1,620 houses destroyed and 681 damaged. Details of the level of damage per province can be seen in Figure 18 and Table 11.

Causes of the damage ranged from natural factors, such as floods (and/or flash floods) and landslides, to manmade factors, like the collapse of the Xepien-Xenamnoy hydropower dam. In some cases, concrete houses that were well constructed were damaged, as they were in high-risk areas prone to landslides. Other factors to consider are the low quality of materials and of construction, and the limited skills of the homeowners who constructed their own houses. The damage to the housing sector could possibly have been minimized through better settlement planning, especially with regard to raising awareness of dangers related to construction in lowlands and other disaster-prone areas.

Losses

The total losses in the provinces assessed stand at 0.574 billion Lao kip. As Table 12 shows, two main types of losses could be identified. First, a loss of revenue resulting from the loss of income generated from rent was noted in five provinces (Oudomxay, Luangprabang, Xiengkhuang, Savannakhet, and Attapeu). The damaged houses are now in no condition to be rented out, which has imposed a major financial loss on the sector. While the percentage of houses rented is not high (see above), the loss of rental income remains an important one to consider. Second, two provinces (Oudomxay and Attapeu) incurred losses from providing temporary shelters to house affected people and carrying out such activities as debris removal and unsafe structure demolition.

37. Although the house sizes vary from province to province (see above), the replacement costs assume the same size houses in all provinces.

Table 9 — Preferred Housing Materials in Affected Provinces

PERCENTAGE OF MATERIAL USED					
ROOFS		WALLS		FLOORS	
Tile/sipax/concrete	38.7	Brick/concrete	35.1	Ceramic/tile	20.5
Zinc	51.5	Wood	45.1	Concrete	23.0
Other	9.8	Bamboo	18.3	Wood	40.6
		Other	1.5	Bamboo	7.0
				Other	8.9

Source: UN-Habitat analysis based on data from Lao Statistics Bureau, Population and Housing Census 2015.

Table 10 — Damage and Losses to Housing and Settlements

PROVINCE	NUMBER OF HOUSES AFFECTED		DAMAGE (BILLION LAO KIP)	LOSSES (BILLION LAO KIP)
	DESTROYED	DAMAGED		
Phongsaly	10	0	0.488	-
Luangnamtha	5	1	0.135	-
Oudomxay	11	119	0.138	0.082
Bokeo	4	0	0.015	-
Luang Prabang	81	170	0.85	0.021
Xayaboury	9	11	0.09	-
Xiengkhuang	76	105	3.47	0.005
Borikhamxay	0	6	0.001	-
Savannakhet	6	26	0.08	0.0084
Sekong	15	26	0.16	-
Attapeu	1,403	217	16.12	0.458
TOTAL	**1,620**	**681**	**21.128**	**0.574**

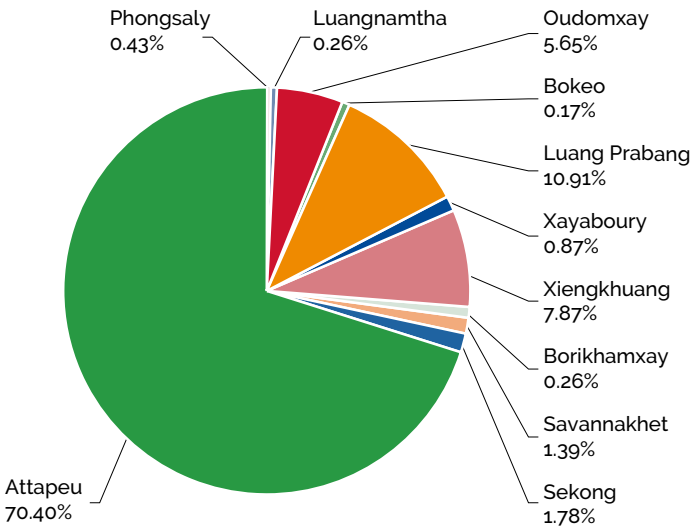
Source: UN-Habitat analysis based on provincial DPWT data.

Table 11 — Damage to Houses by Province

PROVINCE	HOUSES DESTROYED		HOUSES DAMAGED LOSSES (BILLION LAO KIP)		TOTAL VALUE (BILLION LAO KIP)
	NUMBER	VALUE (BILLION LAO KIP)	NUMBER	VALUE (BILLION LAO KIP)	
Phongsaly	10	0.049		-	0.049
Luangnamtha	5	0.133	1	0.002	0.135
Oudomxay	11	0.042	119	0.097	0.138
Bokeo	4	0.015	-	-	0.015
Luang Prabang	81	0.699	170	0.152	0.851
Xayaboury	9	0.083	11	0.007	0.089
Xiengkhuang	76	0.980	105	2.494	3.474
Borikhamxay	-	-	6	0.009	0.009
Savannakhet	6	0.069	26	0.011	0.079
Sekong	15	0.128	26	0.034	0.162
Attapeu	1,403	15.757	217	0.364	16.120
TOTAL	**1,620**	**17.953.9**	**681**	**3.168**	**21.122**

Source: UN-Habitat analysis based on provincial DPWT data.

Figure 18 — Percentage of Damage by Province



Source: UN-Habitat analysis based on provincial DPWT data.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON HOUSING AND SETTLEMENTS

The disaster has affected basic service delivery mechanisms in many ways, and the social impact of the damage has been further exacerbated by the frail existing systems in the affected regions. Most of the affected households with limited financial means face daunting challenges to purchasing construction materials and then transporting them to the sites. All the factors involved in reconstruction put a great amount of pressure on the affected communities.

One of the major and immediate challenges noted is the lack of relief shelters for the affected communities. In most cases, relatives and acquaintances act as hosts for people who have lost their homes, putting significant stress on their resources.

Also to be considered is that the houses are generally self-constructed. Female-led households and disadvantaged groups in particular face challenges to reconstructing the houses, as they have limited access to labor and, at times, limited skills to rebuild on their own.

RECOVERY STRATEGY AND NEEDS FOR HOUSING AND SETTLEMENTS

Short-Term (One Year)

In all 11 provinces, the local authorities have already provided some assistance to the affected households, mostly in the form of rice and other food provisions; but, in some cases—mainly in Oudomxay, Luangprabang, and Attapeu (Sanamxay)—assistance has also included shelter kits, consisting of housing construction materials, such as corrugated zinc for roofing, nails, hammers, saws, and so on. Although in many provinces many affected people have already moved to temporary housing (mostly self-financed) or repaired their damaged houses, many households will need further assistance with housing rehabilitation or acquisition of reconstruction materials, including wood, roofing, and tools. The field visits also found an urgent need to provide everyday household items to affected people, as many households lost significant proportions of their contents and assets in the disaster. Only Oudomxay and Attapeu reported having provided temporary shelters for households whose houses were destroyed or damaged. Appropriate assistance will, therefore, be provided, mostly prioritized by the extent to which the households were affected and the level of damage incurred. The proposed recovery activities are the following:

- **Rapid assessment of lowlands and disaster-prone areas:** A rapid exercise to map the risk of natural disasters in these areas is to be undertaken.
- **Capacity building on BBB:** The capacity of local carpenters and masons with regard to the "build back better" (BBB) principle for housing rehabilitation and reconstruction needs to be increased. Furthermore, risk awareness in the communities needs to be raised and other Disaster Risk Management (DRM) activities carried out.
- **Housing rehabilitation/reconstruction:** The housing rehabilitation process will, where appropriate, involve providing shelter kits and trainings on construction methods, while the reconstruction process will involve providing assistance in the form of financial grants, shelter kits, and other in-kind support. The rehabilitation and reconstruction support will include the provision of materials available locally, such as wood, sand, and gravel, at no or low cost. Local carpenters and masons trained on the BBB principle will be expected to contribute labor to the rehabilitation and reconstruction process.

Medium- to Long-Term Needs (Two to Three Years)

The focus of the medium to long terms will be the severely affected districts in Oudomxay, Luangprabang, Xiengkhuang, and Attapeu. The proposed recovery activities are the following:

- **Mapping lowlands/disaster-prone areas:** A detailed risk-mapping and vulnerability assessment exercise is to be undertaken. Any future land allocations for housing should be carefully mapped vis-à-vis the risks of natural disasters in the area. The focus will be on developing information graphics of the affected communities, as well as the entire districts.
- **Awareness raising and relocation of highly vulnerable communities or houses:** Any communities or houses located in high-risk areas need to be made aware of the associated risks. Relocations of vulnerable buildings and facilities within villages to less hazardous locations, as well as any potential relocation of vulnerable communities or households, should be undertaken in close consultation with the affected people of both genders.
- **Capacity building in the housing sector:** The capacity of the government institutions, as well as communities, with regard to disaster-resilient housing construction needs to be increased. Capacity building should also include the drafting of guidelines on early warning systems, safe houses, and other DRM activities. Further dialogue with the communities on DRM measures specifically contextual to their situations is required.
- **Housing reconstruction:** The recommended approach to housing reconstruction is a combination of financial and in-kind grants. In-kind grants will consist of the provision of materials locally available, such as wood, sand, and gravel, at no or low cost, as well as land provisions. The local carpenters, masons, and communities trained on the BBB principle will be expected to contribute labor to the reconstruction process. Although the work will be anchored with local government agencies, the focus will be on community involvement to safeguard transparency and ensure community tensions do not arise in any way.

Table 12 — Losses (billion Lao kip) to Housing and Settlements by Province

PROVINCE	LOSSES		TOTAL LOSSES
	PRIVATE (RENTED HOUSES)	PUBLIC (TEMPORARY SHELTERS)	
Oudomxay	7.5	74.0	0.082
Luang Prabang	21.3	-	0.021
Xiengkhuang	5.2	-	0.005
Savannakhet	8.4	-	0.008
Attapeu	127.6	330.0	0.57
TOTAL	**170.0**	**404.0**	**0.57**

Source: UN-Habitat analysis based on provincial DPWT data.

Table 13 — Recovery and Reconstruction Needs (billion Lao kip) in Housing and Settlements Sector

SHORT-TERM RECOVERY NEEDS (ONE YEAR)		
PROGRAM OF ACTIVITY	**COST (BILLION LAO KIP)**	**RESPONSIBLE AGENCIES**
Rapid assessment of lowlands/disaster-prone areas	0.6	MPWT, provincial government, UN-Habitat, and other national/international agencies
Capacity building on BBB	0.4	MPWT, provincial government, UN-Habitat, and other national/international agencies
Housing rehabilitation/ reconstruction	28.0	MPWT, provincial government, UN-Habitat, and other national/international agencies
MEDIUM- TO LONG-TERM RECOVERY NEEDS (TWO TO THREE YEARS)		
Mapping of lowlands/disaster-prone areas	4.5	MPWT, provincial government, UN-Habitat, and other national/international agencies
Awareness raising and relocation of highly vulnerable communities/houses	1.3	MPWT, provincial government, UN-Habitat, and other national/international agencies
Capacity building in the housing sector	1.9	MPWT, provincial government, UN-Habitat, and other national/international agencies
Housing reconstruction	36.9	MPWT, provincial government, UN-Habitat, and other national/international agencies
TOTAL	**73.60**	

Note: MPWT = Ministry of Public Works and Transport.

HOUSING AND SETTLEMENTS METHODOLOGY

In coordination with DHUP of MPWT, UN-Habitat supported field-based data collection at the provincial and district levels, with assistance from DPWT. Its objective was to collect secondary data to quantify the level of damage in the housing sector. The assessment was supported by a team of experts who visited the four most affected provinces (Oudomxay, Luangprabang, Xiengkhuang, and Attapeu) following a short training with DHUP staff and in line with Post-Disaster Needs Asssessment (PDNA) guidelines. Damaged houses were visited in person, and consultations were held with affected communities and relevant stakeholders, such as village chiefs and district governors or officers.

Primary data were collected in the four most affected provinces. For the remaining seven, DHUP and DPWT facilitated the data collection for the affected districts and villages. The housing sector guidance note and templates for PDNA were translated into the Lao language, shared with DHUP, and distributed to the relevant provinces. In many cases, the damaged houses were located in areas with no rural roads and accessible only by two to three hours of trekking. In such situations, the district DWPT tried to carry out the assessment to the best of its ability. Where a village was not accessible at all, the partners gathered data through telephone consultations with the village chiefs. Tight timelines limited the number of provinces the team could visit. The team was able to visit four of the affected provinces; for the rest, DHUP gathered the information by email or telephone.

UNDP Lao PDR, Community Radio Project.

Attapeu, October 2018.

EDUCATION

EDUCATION SUMMARY

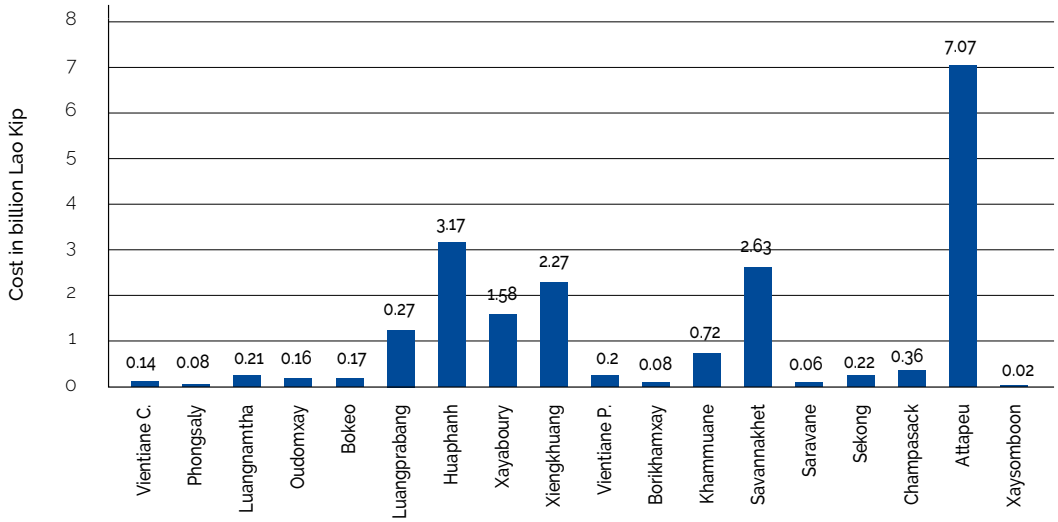
The floods caused damage to 229 public schools and severely disrupted education services across the country, resulting in damage and losses to the education sector totaling an estimated 20.4 billion Lao kip. In the wake of the disaster, the Ministry of Education and Sports (MOES) drafted an Education Sector Recovery Strategy (ESRS), with development partners such as United Nations Children's Fund (UNICEF) and Plan International outlining key activities required to meet short-, medium-, and long-term education needs. This comprehensive strategy is recommended for implementation over a period of five years to ensure the full recovery of the education sector, strengthen Lao PDR's broader education system, and enhance resilience to future disasters at the local, regional, and national levels. The total funding required for the implementation of these activities is estimated at 197.6 billion kip. Figure 19 shows the distribution of damage and losses by province.

EDUCATION BACKGROUND

MOES is one of the largest government ministries in Lao PDR, in terms both of the size of the population served and the required annual government budgetary allocation. The budget allocation for the education sector is, however, decreasing by the year. The formal education system provides early childhood education, primary education, lower and upper secondary education, complete secondary education, technical and vocational education, higher education, and teacher education.

According to data from the Education Management Information Systems (EMIS) for 2017–18, Lao PDR had 3,212 early childhood centers with 229,892 students, 8,858 primary education centers with 786,246 students, and 962 lower secondary education centers with 180,020 students (see Table 14). Although the country has met the Millennium Development Goals (MDGs) with regard to access to primary education with gender parity by taking significant steps to increase enrollment, the quality of educational outcomes remains poor, and students with disabilities are significantly underenrolled. In addition, disparity persists in rates of enrollment, repetition, dropout, and completion between males and females, between and within ethnic groups, between nonpoor and poor districts, and

Figure 19 — Cost Distribution of Damage and Losses by Province



Source: MoES Provincial Survey Data, 2018.

Table 14 — Education Sector at a Glance

SUB-SECTOR	NUMBER OF YEARS IN EACH SECTOR	NUMBER OF STUDENTS	TYPE AND NUMBER OF INSTITUTES			NUMBER OF TEACHERS FOR BOTH PRIVATE AND PUBLIC	NUMBER OF ADMINISTRATORS FOR BOTH PRIVATE AND PUBLIC
			TOTAL	PUBLIC	PRIVATE		
Early childhood education	3	229,892	3,212	2,742	470	11,105	626
Primary education	5	786,246	8,858	8,604	254	32,428	1,730
Lower secondary education	4	180,020	962	905	57	38,423	670
Upper secondary education	3	22,431	36	36	0		
Complete secondary schools	7	468,613	760	716	44	5,022	1,476
Technical and vocational education	2 to 3	74,862	107	44	63	11,105	626
University	4 to 5	40,098	5	5	0	2,174	1,032
Teacher education	3 to 4	11,109	12	12	0	1,229	132

Source: Ministry of Education and Sports, 2018.

between urban and rural areas, as well as between rural locations with road access and those without. Other learners excluded from education include street and working children, orphans, victims of trafficking and violence, pregnant girls and young mothers of school age, children infected with or affected by HIV and AIDS, and individuals with challenging social issues. The extent to which these learners are provided education is not known at present.

All of these challenges to the education sector in Lao PDR have been regularly exacerbated in recent years by disasters. In 2013, 196 schools were damaged by disasters. In 2014 the number was 59, and in 2015 it was 29; in 2016, the total of damaged schools was 82, and in 2017, it was 129.[38] The assessment below provides information on the schools damaged and destroyed in the 2018 floods.

ASSESSMENT OF DISASTER EFFECTS ON EDUCATION

Damage

The number of affected schools in Lao PDR varies by province, with Khammuane the most affected (see Figure 20). Some schools in the most affected provinces, such as Savannakhet, were submerged in water for up to two months. Poor construction practices that have made schools vulnerable to any type of hazard resulted in severe damage to many of their foundations by the floods.

School classrooms and toilets incurred damage to foundations, walls, ceilings, and roofs. Damaged assets include teachers' manuals, textbooks, and school furniture and supplies such as student and teacher tables, desks, chairs, blackboards, and chalk. Damaged electronic devices include computers and printers. In some areas, access to schools and temporary learning facilities has become increasingly difficult due to waterlogging, destroyed roads, and debris. Water levels reached up two or three meters in some parts of Khammuane and Savannakhet provinces.

38. Derin Henderson and Jonika Paulsen, Education Country Baseline in Lao PDR: Annex of the Country Status Report 2017—Sendai Framework (Xaysetha District, Vientiane Capital: Save the Children in Lao PDR, March 27, 2017).

Losses

The assessment revealed that children have a strong will to return to school but require continued assistance to do so. The majority of those residing in affected areas reported loss of uniforms, learning materials, musical instruments, sports equipment, and other items needed for their education. Children also expressed a desire to play in school playgrounds and to regain access to school lunches. Furthermore, many face severe disruption at home from the destruction of houses and displacement of families. While these ongoing disruptions to their home and school environments presumably challenge the children's motivation and confidence to study, it is impossible at present to measure these effects of the floods and quantify relevant efficiency losses

SOCIAL IMPACT OF DAMAGE AND LOSSES ON EDUCATION

All children are vulnerable to disasters, during which they are largely reliant on adults for protection from harm. The assessment revealed a clear lack of preparedness in schools and communities among the adult population, which may have resulted in inadequate protection of the children and other vulnerable community members. In addition to identifying a significant need to implement disaster preparedness and risk management activities in schools and communities, the assessment identified a capacity gap in affected communities to undertake such activities. At present, many children are studying in buildings that have experienced severe structural damage and are prone to collapse, exposing the children to further risk.

In conjunction with preparing schools and communities for disasters, it is also important to address issues around existing educational and equity disparities in terms of school retention, learning outcomes, and access to education services based on levels of vulnerability across the different social variables, such as gender, ethnicity, location, disability, and socioeconomic status. MOES expects to implement the Education Sector Recovery Strategy (ESRS) nationwide to ensure all schools will have the necessary tools and knowledge to enhance disaster preparedness and build resilience at the community level. MOES hopes to create a consortium with leading development partners to carry out the detailed planning and implementation of the ESRS.

RECOVERY STRATEGY AND NEEDS FOR EDUCATION

The assessment found that teachers urgently require assistance with building rehabilitation and the acquisition of teaching and learning materials and equipment. In addition, the teachers have recognized the importance of Disaster Risk Management (DRM) education in school, and they want to build their capacity on DRM to teach children about disaster preparedness. Although teachers and village authorities have cleared some of the debris and started temporary learning shelters to maintain the regular school calendar and cover the syllabus, the facilities are inadequate, and support is required from the development sector to restore core educational facilities and services. In the meantime, the District Education and Sports Bureau (DESB) and Provincial Education and Sports Services (PESS) are doing their utmost to support these shelters, and most of the provincial bureaus are already making plans to support education services in affected villages.

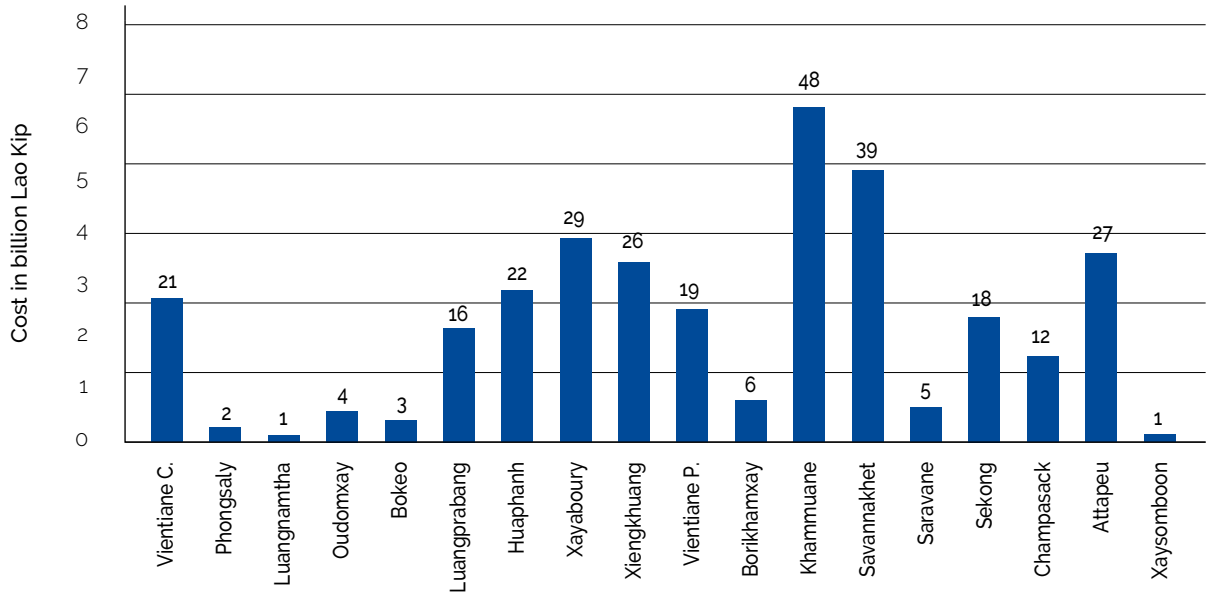
In drafting the ESRS, MOES, together with development partners such as UNICEF and Plan International, identified key activities whose implementation is needed to meet short-, medium-, and long-term post-disaster needs. The Education Sector Recovery Strategy will strengthen the education system in Lao PDR, making schools and communities more resilient to disasters, as well as to the effects of climate change.

Short-Term Strategy and Needs (One Year)

Lao PDR's short-term post-disaster needs are those that must immediately be met to resume the delivery of education services while the reconstruction and rehabilitation of permanent structures are carried out. Meeting short-term needs includes the following:

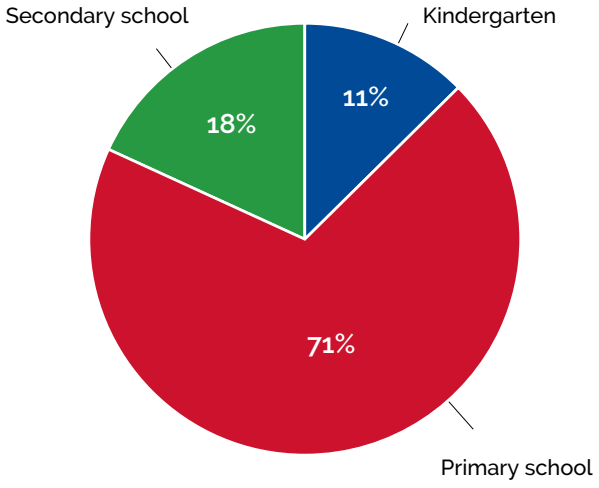
- **Improve learning facilities for children to restart their educations.**
  - Provide temporary learning shelters and spaces, including tents, furniture, blackboards, and chalk.
  - Rehabilitate or renovate affected schools.
  - Remove debris and clear sites of damaged schools.
  - Reconstruct damaged facilities and institutions using principles of "build back better."

Figure 20 — Affected Schools by Province



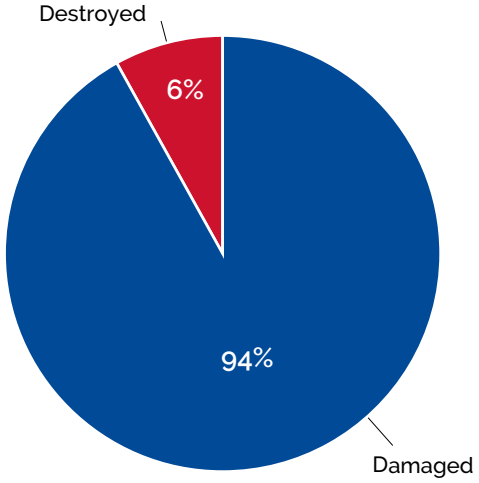
Source: MoES provincial survey data, 2018.

Figure 21 — School Building Damage by Education Level



Source: MoES provincial survey data, 2018.

Figure 22 — School Building Damage by Level of Damage



Source: MoES provincial survey data, 2018.

Table 15 — Damage and Losses (billion Lao kip) to Education by Education Level

SUB-SECTOR	DAMAGE	LOSSES	TOTAL EFFECTS
Pre-primary	0.29	0.84	0.37
Primary school	14.4	1.25	15.65
Secondary school	4.04	0.35	4.39
TOTAL	**18.73**	**1.68**	**20.41**

Source: MoES provincial survey data, 2018.

- **Provide learning materials and equipment.**
    - Provide textbooks, teacher manuals, and student record books.
    - Provide learning materials and kits to students.
    - Provide computers, printers, and other necessary equipment.
- **Create an enabling environment in schools.**
    - Provide school lunches to students in affected schools.
    - Conduct a multi-hazard risk assessment and develop a risk information system for the education sector.
    - Develop national indicators on DRM and integrate them into the EMIS database.
    - Create an Education DRM framework.
    - Evaluate the implementation of comprehensive school safety on all three pillars (safe learning facilities, school DRM, and risk reduction and resilience education).
    - Update the sector contingency plan.

Medium-Term Strategy and Needs (Two to Three Years)

The strategy to meet medium-term needs will be focused on strengthening Disaster Risk Management and recovery strategies in schools and communities, especially through child-centered resilience building. This will require reviewing and revising existing legal and oversight mechanisms for strengthening and ensuring safety in all types of educational facilities. Meeting medium-term needs includes the following:

- **Provide training and capacity building.**
    - Conduct "training of trainers" (ToT) sessions on psychosocial support for teachers and volunteers.
    - Train school stakeholders (education officials, principals, teachers, and village education development committee members) on a comprehensive Safe Schools program.
    - Train relevant stakeholders on conducting rapid assessment and post-disaster needs assessment.

Table 16 — Damage and Losses (billion Lao kip) to Education by Province

PROVINCE	DAMAGE	LOSSES	TOTAL EFFECTS
Vientiane Capital	0.10	0.04	0.14
Phongsaly	0.07	0.01	0.08
Luangnamtha	0.20	0.01	0.21
Oudomxay	0.14	0.01	0.16
Bokeo	0.16	0.01	0.17
Luangprabang	1.19	0.08	1.27
Huaphanh	3.10	0.07	3.17
Xayaboury	1.43	0.15	1.58
Xiengkhuang	2.15	0.12	2.27
Vientiane Province	0.13	0.07	0.20
Borikhamxay	0.06	0.01	0.08
Khammuane	0.49	0.23	0.72
Savannakhet	2.33	0.30	2.63
Saravane	0.05	0.01	0.06
Sekong	0.17	0.04	0.22
Champasack	0.30	0.06	0.36
Attapeu	6.63	0.44	7.07
Xaysomboon	0.02	0.00	0.02
TOTAL	**18.73**	**1.68**	**20.41**

Source: MoES provincial survey data, 2018.

- **Safeguard school communities from deaths and injuries resulting from structural collapse and damage to school buildings.**
  - Revise the school construction guidelines by including adequate building codes covering the selection of safe locations to build schools and the construction of disaster-resilient school buildings.
  - Conduct comprehensive training for 296 engineers on revised construction guidelines and disaster-resilient construction to ensure future buildings are built according to resilient principles.
  - Assess existing capacity on disaster management at the school, subnational, and national levels.
- **Strengthen disaster preparedness and response at the school and community levels through school-based DRM and community-based DRM training and planning.**
  - Update the existing education curriculum by including comprehensive DRM topics/modules (including climate change adaptation) into formal curriculum, as well as practical/experimental learning, providing all necessary materials.
  - Develop DRM guidelines for schools, including emergency response plans for each.
  - Engage schools in ongoing risk reduction and emergency management planning, including risk reduction, response preparedness, and education continuity planning at all levels.
  - Conduct emergency response drills on a regular basis and put into place the necessary provisions for effective school DRM.
  - Link school DRM plans with local DRM planning and practices.
- **Enhance knowledge, attitudes, and skills related to DRM among students and the general public to develop a culture of safety.**
  - Establish a mechanism for coordination of the education sector on DRM and recovery, including impact assessment and reporting, school rehabilitation and construction, psychosocial support, financial assistance to schools, individual students, teachers, and staff, and so on.
  - Develop an education continuity plan for education management units or areas and individual schools, including temporary learning shelters and spaces, alternative education delivery modes, and provision of learning materials.
  - Promote the acquisition of risk reduction knowledge and skills through extracurricular activities based on local contexts.
  - Create awareness on climate change and disaster risks through programs such as Child Centered Climate Change Adaptation.
- **Enhance the capacity of the EMIS to collect, analyze, and disseminate information on all higher education institutions in the country.**
  - Provide training on data collection and data analysis to improve the quality of the data in the EMIS.

Long-Term Strategy and Needs (Three to Five Years)

The strategy to meet long-term needs will focus on long-term development issues, such as ensuring education safety across the country, along with investing in making buildings resilient to different types of disasters. In the long term, all educational institutions need to be built on the principle of "build back better," in line with the best international practices for school safety. Meeting long-term needs includes the following:

- **Strengthen DRM to safeguard school communities from deaths and injuries resulting from structural collapse and damage to school buildings.**
  - Set performance standards for school construction.
  - Develop guidelines and a financing system for ongoing and deferred maintenance.
  - Ensure building maintenance is conducted on a regular basis and necessary actions are taken accordingly.

Table 17 — Disaster Recovery and Reconstruction Needs (billion Lao kip)

RECOVERY NEEDS	SHORT-TERM	MEDIUM-TERM	LONG-TERM	TOTAL NEEDS
Priority 1: Short-term needs	Improving learning facilities for children to restart their educations	--	--	168.9
Priority 2: Medium-term needs	--	Providing training to make sure education providers are disaster ready	--	18.9
Priority 3: Long-term needs	--	--	Strengthening DRM in education sector	9.8
TOTAL	**168.9**	**18.9**	**9.8**	**197.6**

Note: DRM = Disaster Risk Management

- Supervise and audit construction of school facilities.
- Develop different designs for disaster-resilient school facilities suited to local contexts.
- Develop guidelines for construction of safe schools and associated facilities.
- Educate builders and contractors on safe school construction.
- Provide safety supplies and equipment, such as emergency kits in every classroom, fire extinguishers, first aid kits, and evacuation alarms.
- Establish regular monitoring of school building safety by relevant entities.
- Create a pool of professionals who are technically competent in the areas of hazard-resistant design and construction.

- **Implement DRM to ensure school communities (and the education sector as a whole) can assess risks, plan for mitigation, prepare for response, cope with and recover from disaster events, and act effectively and promptly when affected by a disaster.**
  - Establish disaster preparedness teams in schools.
  - Undertake disaster preparedness planning in schools in the form of standards, procedures, and contingency plans.
  - Develop a teaching and learning strategy to follow during emergencies.
- **Enhance knowledge, attitudes, and skills related to DRM among students and the general public to develop a culture of safety.**
  - Build DRM capacity of school stakeholders (principals, teachers, communities, students, and other education personnel) and increase school supervision.
  - Carry out evacuation simulation drills on a regular basis.
  - Integrate DRM education into various subjects and extracurricular activities.
  - Conduct regular information campaigns on practical, key safety measures.
- **Institutionalize mechanisms to ensure all educational and sports institutions and facilities are disaster resilient.**
  - Restructure and rehabilitate units within the MOES system to ensure continued safety in the entire education sector, including private institutions.
  - Establish a central DRM unit in the MOES.
  - Build DRM capacity of the Central Coordination Unit at the MOES by providing necessary training, equipment, and vehicles.

- At the central level, establish a Disaster Risk Management unit to lead and coordinate national DRM strategy and appoint designated focal points to coordinate at all levels.

- Strengthen the capacity of higher education for DRM research.
  - Establish dedicated research centers at universities.
  - Establish disaster management–related degrees and professional training courses to create a pool of DRM professionals.

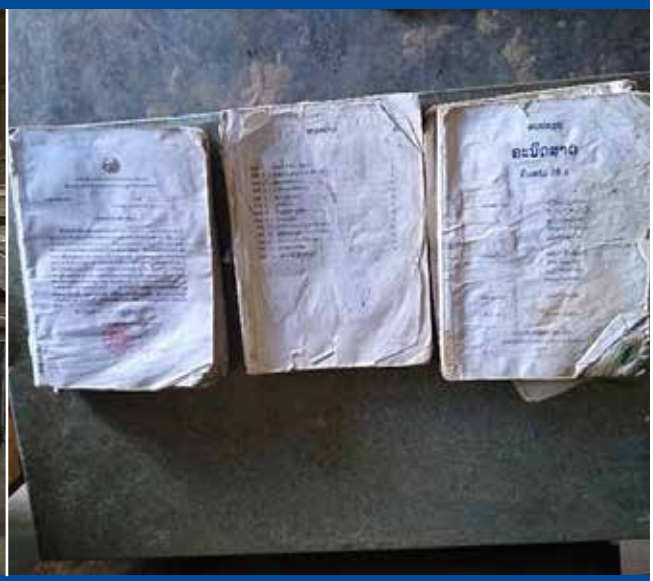
EDUCATION METHODOLOGY

A rapid assessment was conducted in September 2018, followed by the post-disaster needs assessment (PDNA) conducted September through October 2018. All assessed schools were public schools. The data for this survey were collected by the MOES staff, together with Plan International, Save the Children, and UNICEF. Research teams visited Attapeu, Khammuane, and Savannakhet. Other district data were collected by the MOES staff in the field. The data were analyzed and interpreted by a data and development sector expert from Plan International Australia.

Photo credit: MOES Staff.

Ban Pong Primary School underwater in Boulapha District, Khammuane Province.

Destroyed classroom at Mahaxay Primary School in Mahaxay District, Khammuane Province.



Destroyed textbooks at Tapak Primary School in Sanamxay, Attapeu.

HEALTH AND NUTRITION

HEALTH AND NUTRITION SUMMARY

The Ministry of Health (MOH) reported 37 public health facilities (35 health centers and 2 district hospitals) affected by the floods across 10 provinces, out of a total of 688 health facilities (615 health centers and 73 district hospitals). The post-disaster needs assessment (PDNA) only covered 23 health facilities in six provinces, however (Attapeu, Champasack, Savannakhet, Khammuane, Xiengkhuang, and Huaphanh), the selection of which was based on the severity of flooding. Of these, 3 facilities were completely destroyed and 20 damaged. The total damage to facilities was estimated at 8.58 billion Lao kip. In addition to damage to infrastructure, losses estimated at 3.32 billion Lao kip were also incurred, reflecting temporary measures, recovery needs, and other expenses, with particular emphasis on the prevention of malnutrition and disease outbreaks. Data collected from the six provinces assessed were used to extrapolate damage and loss information for all 10 provinces affected, producing an estimate of 27.3 billion Lao kip for recovery needs for the health and nutrition sector. Private health facilities were not included in the assessment.

HEALTH AND NUTRITION BACKGROUND

Table 18 presents vital health indicators based on the 2015 Lao Statistical Bureau population census and the 2017 Lao Social Indicator Survey II for the 10 provinces affected by the floods. The crude death rate[39] was higher than the national average in all the affected provinces except Savannakhet and Champasack. The mortality rate for children under five years of age was higher in Khammuane, Attapeu, Phongsaly, Oudomxay, and Xaysomboon. The prevalence of wasting among children in this age group was higher than the national average in Huaphanh, Attapeu, and Phongsaly. No baseline data were available on people living with disabilities or mental health conditions.

In terms of access to health and nutrition services in Lao PDR, universal health care was nationally available for 17 provinces[40] (population coverage approximately 71 percent) as of 2018, inclusive of all age groups. Previously, patients had to pay for health services. The plan is to achieve universal health coverage for the entire population by 2025.

Table 18 — Vital Indicators Reported in Lao PDR (per 1,000)

INDICATOR	LAO PDR	HP	XK	KM	SVNK	CPS	ATP	PSL	ODX	LNT	XSB
Crude death rate	8.2	10.8	9	9.6	7.1	6.6	9.9	10.8	11.4	11.1	8.7
Neonatal mortality rate (first month of life)	18	27	16	23	3	11	35	27	28	10	27
Infant mortality rate (up to one year)	40	44	33	54	32	40	56	32	40	17	47
Under-five mortality rate	46	44	39	63	38	45	59	68	71	42	51
Wasting prevalence (percentage of children under five)	3.0	8.3	1.8	2.3	2.9	2.7	4.2	4.5	1.6	1.4	1.1

Source: Lao Statistics Bureau, Census 2015, https://www.lsb.gov.la/pdf/PHC-ENG-FNAL-WEB.pdf; Lao Social Indicator Survey II, 2017.

Note: HP = Huaphanh; XK = Xiengkhuang; KM = Khammuane; SVNK = Savannakhet; CPS = Champasack; ATP = Attapeu; PSL = Phongsaly; ODX = Oudomxay; LNT = Luangnamtha; XSB = Xaysomboon.

39. The Organisation for Economic Co-operation and Development (OECD) defines the crude death rate as the number of deaths occurring among the population of a given geographical area during a given year per 1,000 midyear total population of the given geographical area during the same year.

40. The 18th province, Vientiane Capital, was not included.

To assess the prevalence of epidemic-prone diseases and malnutrition, hospital inpatient and outpatient data were extracted from District Health Information System 2 (DHIS2) for children under and over five years of age for all districts in the six provinces assessed for selected diseases and conditions, including the common cold, dengue fever, diarrhea with severe dehydration, diarrhea with blood, malnutrition, malaria non P. falciparum, pneumo-bronchitis, severe pneumo-bronchitis, skin disorders, and tonsillitis. For all districts, the main causes of morbidity were upper and lower respiratory infections (5,201 and 6,885 cases of pneumo-bronchitis reported for children above and below age five, respectively), skin disorders, diarrhea with blood (1,746 and 1,480 cases for children above and below age five), malnutrition (951 and 157 cases), and dengue (307 inpatient cases reported in children over the age of five).

ASSESSMENT OF DISASTER EFFECTS ON HEALTH AND NUTRITION

Damage

Total damage to health facilities was estimated at 8.58 billion Lao kip (see Table 19).[41] According to MOH, 37 health facilities were reported as affected by flooding in 10 provinces, including 35 health centers and 2 district hospitals.[42] The PDNA only covered 23 of these facilities in the six provinces assessed (Attapeu, Champasack, Savannakhet, Khammuane, Xiengkhuang, and Huaphanh), the selection of which was based on the severity of flooding, and data collected from these six provinces were used to extrapolate damage and losses information for all 10. Of the twenty-three facilities assessed by the PDNA team, three—two in Xiengkhuang and one in Attapeu—were completely destroyed. An additional twenty were damaged, with some having building damage and others damage to the water, sanitation, and hygiene (WASH) systems. A secondary assessment by MOH reported an additional 14 facilities (12 health centers and 2 district hospitals) as being affected by the floods. As the PDNA team could not verify the level of damage to these 14 facilities, the MOH estimates for them were used in calculating the total cost of damage and losses to all 37 affected health facilities.

Losses

Losses were estimated at 3.3 billion Lao kip. For totally destroyed health centers, the losses include foregone income, calculated as the daily average income (5,000 Lao kip) multiplied by the number of clients visiting the health center before flooding and multiplied by the time needed for reconstruction. The cost of removal and disposal of debris, mud, and biohazardous material was estimated during the site visits. Higher operating costs resulting from the floods, including higher costs of medical and health care, costs of setting up and operating temporary health service points, prevention and mitigation costs, and direct costs associated with the control of disease outbreaks or higher morbidity rates, were estimated at 935 million Lao kip for Attapeu Province and 250 million Lao kip for the others. Other expenses include the cost of services delivered to serve the communities living around the health centers, including the cost of labor, road access, and other support provided.

41. For destroyed health centers, the cost of damage is based on the reconstruction cost of a small health center (2.2 billion Lao kip) and the cost of furniture for a new center (60 million Lao kip). The details of the infrastructure, equipment, and supplies required to reconstruct and refit a health center were derived from MOH standards. These were detailed in PDNA collection tools for the health sector (not included in this chapter). For damaged health facilities, the cost of the damage may or may not include building costs (for example, for electrical infrastructure), furniture, office equipment, WASH equipment, or medical equipment (see Table 19).
42. These were all public health facilities. Because baseline information was lacking, private facilities were not included in the assessment.

Table 19 — Damage and Losses (billion Lao kip) in Health and Nutrition by Province

PROVINCE	TOTAL		PDNA		MOH ASSESSMENT		TOTAL DAMAGE	TOTAL LOSSES	TOTAL EFFECTS
	AFFECTED DISTRICT HOSPITALS	AFFECTED HEALTH CENTERS	HEALTH CENTERS DESTROYED	HEALTH CENTERS DAMAGED	AFFECTED DISTRICT HOSPITALS	AFFECTED HEALTH CENTERS			
Vientiane Capital	--	--	--	--	--	--	--	--	--
Phongsaly	--	1	--	--	--	1	0.050	0.25	0.3
Luangnamtha	--	2	--	--	--	2	0.080	0.25	0.33
Oudomxay	1	--	--	--	1	--	0.15	0.25	0.4
Bokeo	--	--	--	--	--	--	--	--	--
Luangprabang	--	--	--	--	--	--	--	--	--
Huaphanh	--	5	--	3	--	2	0.17	0.27	0.447
Xayaboury	--	--	--	--	--	--	--	--	--
Xiengkhuang	--	2	2	--	--	--	4.75	0.27	5.021
Vientiane Province	--	--	--	--	--	--	--	--	--
Borikhamxay	--	--	--	--	--	--	--	--	--
Khammuane	--	12	--	7	--	5	0.712	0.267	0.98
Savannakhet	--	4	--	4	--	--	0.175	0.268	0.443
Saravane	--	--	--	--	--	--	--	--	--
Sekong	--	--	--	--	--	--	--	--	--
Champasack	--	6	--	4	--	2	0.102	0.252	0.354
Attapeu	--	3	1	2	--	--	2.318	0.987	3.3
Xaysomboon	1	--	--	--	1	--	0.065	0.25	0.315
TOTAL	**2**	**35**	**3**	**20**	**2**	**12**	**8.57**	**3.318**	**11.89**

SOCIAL IMPACT OF DAMAGE AND LOSSES ON HEALTH AND NUTRITION

The PDNA compared the prevalence of epidemic-prone diseases and malnutrition before and during flood season. Relative to the period July–August in previous years, the selected diseases and conditions increased after the floods by at least 30 percent,[43] signaling a potential association between the flooding and increased disease burden:

- **Malnutrition** in Khammuane Province has led to an acute outbreak of beriberi. From June 1 to November 8, 2018, 343 cases, including 8 deaths, followed flooding that limited access to the roads and damaged the crops of the affected population, creating food shortages and reducing food security.
- **Dengue fever** has increased in Sanamxay, appearing among children over five years of age in both hospital outpatient and inpatient data (61 and 31 cases, respectively).
- **Pneumo-bronchitis** has increased in Sanamxay, with 228 cases in children over five and 26 cases among children under five reported in outpatient and inpatient data; in Xaysettha (91 cases in children over five); and in Nonghed and Xebangfay (167 and 70 cases, respectively, in children under five).
- **Common cold** increased in Sanamxay (395 and 294 cases in children over and under age five, respectively) and Xiengkhor (179 cases in children under five).
- **Diarrhea with severe dehydration** has increased in Xaysettha (62 and 82 cases in children over and under age five, respectively) and Kham (30 and 13 cases).

43. Data on epidemic-prone diseases were extracted from DHIS2 for the past three years. The average number of cases during July–August of this period was compared to the number of cases reported for the same months in 2018.

- **Diarrhea with blood** has increased in Sanamxay (82 cases in children over five).
- **Skin disorders** were reported in Sanamxay (165 and 70 in children over and under five, respectively); Xaybouly and Xaysettha (61 and 27, respectively, in children over five); and Mounlapamok (27 cases in children under five).

RECOVERY STRATEGY AND NEEDS FOR HEALTH AND NUTRITION

Reconstruction of Health Facilities

As mentioned, three health facilities were destroyed by the floods. In addition, MOH identified two damaged facilities as frequently affected by flooding. To address "build back better" considerations, recommendations were made to rebuild all five, with the two additional facilities moved to new locations. The cost to build a "Build Back Better (BBB)" health facility is 3.2 billion Lao kip, which is 1 million Lao kip higher than the unit cost provided by MOH, which did not include the "BBB" concept. Moreover, the cost for the preparation of the land and removal of unexploded ordnance (UXO) is an additional 170 million Lao kip.

Nutrition

To address malnutrition and micronutrient deficiency among children ages 6 to 59 months, sufficient quantities of therapeutic food and micronutrients will be needed, based on caseload estimates. A minimum of two health care providers in each health center and hospital will need to be trained in the management of acute malnutrition and the treatment of micronutrient deficiencies. They will also need support to build their counseling skills and competencies to deliver nutrition services as part of existing maternal and child health programs. Community awareness of different forms of malnutrition and prevention strategies can also be improved by developing a social and behavioral change campaign. The cost for nutrition includes the provision of ready-to-use therapeutic food (RUTF) and additional commodities in 10 provinces.

Disease Prevention and Control

The cost for disease prevention and control was extracted from the MOH disaster response plan for disease surveillance and outbreak response. Since the MOH plan included all flood-affected provinces, not only those with damaged health facilities, the estimated cost for the 10 provinces could not be distinguished separately from it.

Total Monetary Value of Recovery Needs for the Short, Medium, and Long Terms

The recovery of the health sector must be addressed primarily in the short term, as restoration of these services for the population is acutely needed to avoid further morbidity and mortality. Since health is a priority for the government, the needs of this sector are often immediately addressed (see Table 20 for estimated costs to meet these needs). While no medium- and long-term recovery needs were identified by the assessment, therefore, it is recommended to consider interventions to increase disaster resilience. Examples include conducting an overall review of health facilities in flood-prone areas to make structural adjustments for disaster resilience, providing training on flood risk management for health sector personnel, and establishing clear referral networks of health providers for disaster preparedness. As the costs to meet these suggestions cannot be estimated, they are not included in the recovery needs.

In terms of the recovery strategy for the health sector, MOH is participating in the Cabinet-led coordination of recovery plans and activities, inclusive of training for all concerned departments, as part of disaster preparedness. Much of the recovery has already begun, and the priority for MOH is to ensure the reestablishment of routine health services in flood-affected areas.

Health and Nutrition Methodology

Two methods were used for data collection. Primary data collection was based on MOH assessments received from the provinces, while secondary data collection was based on the PDNA methodology and revised tools. MOH, supported by the World Health Organization (WHO), carried out primary data collection by compiling reports on the impact of floods on health infrastructure, water, hygiene and sanitation, and population from all the provincial health departments.

Based on the severity of the flooding in the 10 affected provinces, as indicated by the data collected, MOH identified six (Attapeu, Champasack, Savannakhet, Khammuane, Xiengkhuang, and Huaphanh) for field assessment to validate the data, collect primary information, and hold focus group discussions with local governments, affected populations, and vulnerable groups to gain an understanding of impact and determine recovery needs. Each field team was composed of two MOH staff members, one provincial and one district staff member, and WHO and United Nations Children's Fund (UNICEF) experts.

In the field, the health cluster used the mobile application for FieldSight, a digital platform developed and shared by United Nations Office for Project Services (UNOPS), to monitor affected health facilities and collect data about damage, losses, and facility response, including geographical coordinates, site photos, and site drawings for each affected health facility. WHO staff used these data to generate daily reports at headquarters in Vientiane Capital and to assess damage, losses, and needs. WHO and Ministry of Health staff were trained to use the FieldSight platform before visiting affected facilities. FieldSight generally facilitated data collection and analysis methods for this exercise.

Table 20 — Estimated Short-Term Recovery Needs for Health and Nutrition

SUB-SECTOR	PROGRAM OF ACTIVITY	BILLION LAO KIP
Reconstruction/repair of damaged health facilities and associated losses	• Reconstruction of destroyed health centers • Repair of damaged health centers and district hospitals • Replacement of office and medical equipment	11.89
Relocation of health facilities	• Assessment of site location Acquisition of the land Preparation of the land	6.7
Nutrition	• Increased cost for enhanced screening of severe acute malnutrition (SAM) and moderate acute malnutrition (MAM), as part of an integrated outreach health service package • Cost of supplies and treatment, including RUTF • Contingency referral system • Additional operational cost associated with treatment, staffing, and capacity building • Nutrition promotion, including prevention of thiamine deficiency	2.571
Disease surveillance and outbreak response	• Reestablishment of routine services Support for rapid response team Health promotion Vector control	0.997
Chronic diseases (TB, HIV, diabetes)	• Reestablishment of routine services Contingency referral system Health promotion	1.22
Mental health	• Reestablishment of routine services Contingency referral system Health promotion	0.97
Mother and child health, including pregnancy, delivery, immunization, and referral	• Reestablishment of routine services Contingency referral system Health promotion	2.52
Vector-borne diseases	• Distribution of bed nets • Fogging in the affected areas • Continuation of larval surveys • Procurement of equipment to conduct activities and of chemicals for destruction of mosquito breeding sites	0.44
TOTAL		**27.32**

CULTURE

CULTURE SUMMARY

The floods inflicted damage and losses on the culture sector across nine provinces. The heaviest damage was reported in Khammuane, Attapeu, and Huaphanh and the greatest losses in Attapeu, Xayaboury, and Vientiane Capital. Built cultural heritage and related infrastructure, such as village temples in Attapeu, stupas in Vientiane Province, and the river embankment of the Luang Prabang World Heritage site, incurred physical damage, as did cultural objects and collections, such as the valuable collection of Buddhist manuscripts and Buddha images kept in Vat Ban Hinlad, Sanamxay District, in Attapeu—the most severely affected province. In addition, the floods disrupted intangible aspects of lowland Lao culture, such as important rituals and ceremonies that could not take place during the months when the floods affected the temples, as well as the cultures of some of the 49 ethnic groups in Lao PDR, including the Oy ethnic group who inhabit three of the villages in Sanamxay District. Not only did these villagers lose their homes to the disaster; the social and cultural fabric of their communities also suffered. Reported monetary losses mainly comprised the diminished revenue to the temples as a result of the villagers' inability to participate in the rituals and festivals, along with loss of income for some artisans; among these were the weavers in Xaythani District, Vientiane Capital, who, because of the floods, could not weave and sell their cloth for some time.

To remediate the damage and losses to the culture sector, urgent short-term measures should include repairing prioritized temples in the most severely affected villages, particularly in Sanamxay District; repairing damaged infrastructure, with priority on the Luang Prabang World Heritage site; and documenting fragile traditions, notably those of the Oy ethnic group. Important for the medium- to long-term recovery is to improve baseline data for the culture sector to serve as a reference for future emergencies. This can be accomplished by providing trainings, conducting inventories, and creating databases of the built and movable cultural heritage and by developing community-based inventories of intangible cultural heritage. In addition, a series of Disaster Risk Management (DRM) workshops is proposed, aimed at preparing the sector and communities for future disasters. Finally, the development of DRM plans should be prioritized for the most important heritage sites in Lao PDR, namely the World Heritage sites; Tentative List sites for future World Heritage nomination; sites included in the National Heritage Registry; and sites included on the provincial lists.

CULTURE BACKGROUND

Lao PDR is a multicultural country with 49 different ethnic groups, each with a distinctive language and culture. The government takes pride in the country's rich cultural diversity, and it promotes and highlights the culture of these ethnic groups as a feature of its tourism strategy. A key indicator of the government's commitment to safeguarding and protecting its cultural heritage is its obligations to United Nations Educational, Scientific and Cultural Organization (UNESCO) conventions. The government has ratified and/or accepted four UNESCO cultural conventions: the 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export, and Transfer of Ownership of Cultural Property (accepted in 2015); the 1972 UNESCO Convention Concerning the Protection of World Cultural and Natural Heritage (ratified in 1987); the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage (ratified in 2009); and the 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions (ratified in 2007).

Lao PDR has two listed World Heritage sites; one is the Town of Luang Prabang and the other Vat Phou and Associated Ancient Settlements within the Champasack Cultural Landscape. Tentative cultural sites for World Heritage include the Megaliths of Xiengkhuang Province (which was nominated in February 2018) and That Luang of Vientiane. One element of intangible cultural heritage, the Kaen Music of the Lao People, was added to the Representative List of the Intangible Cultural Heritage of Humanity in 2017, and two more elements have been proposed for 2018 and 2019.

On a grassroots level, Buddhist temples, which characterize the lowland Lao cultural landscape, undergo ongoing renewal and restoration by the devout communities that constantly use them for the annual cycle of rituals, festivals, and ceremonies. Some provinces, notably Luangprabang, are already compiling an inventory of elements of intangible heritage. It includes traditional puppetry, various oral traditions, dance, and food.

Although the dominant and most visual aspect of the country's cultural landscape is lowland culture, the diverse cultures of non-Lao ethnic groups are found in nearly every province of Lao PDR. These groups speak a variety of distinctive languages, and their social customs, religious belief systems, costumes and music, and performance traditions differ substantially from those of the lowland Lao. The Department of Mass Culture in the Ministry of Information, Culture, and Tourism (MICT) oversees research and the safeguarding of the cultures and traditions of these mostly non-Buddhist ethnic groups. It is assisted in its work by the National Development and National Social Sciences Institute and the Lao Front for National Development.

The rich cultural diversity of Lao PDR includes a craft sector that generates livelihoods for artisans and craft industries all over the country. Some craft industries are on a very small scale, with products—such as fishnets, cloth woven for personal use, and baskets used in the rice fields and homes—produced only for their communities and neighboring villages. A number of craft traditions are highly refined and developed in many parts of Lao PDR. In Luangprabang, for example, exquisite textiles, silver bowls and jewelry, mulberry paper, and baskets are not only used by the local people, but generate important revenue from sales in the national and tourism markets.

ASSESSMENT OF DISASTER EFFECTS ON CULTURE

The impact of the disaster on the culture sector varied greatly, depending on the province and the nature of the flooding—that is, whether the floods were caused by heavier than usual seasonal rains, tropical storms, or dam breakage. As a result, the damage to physical buildings and infrastructure, such as river embankments, roads leading to cultural sites, small bridges, and so on ranged from minor to moderate to severe. Estimates of damage and losses are provided in Table 21 and Table 22.

Part of assessing the damage and losses within the culture sector is understanding the vulnerability of cultural heritage. Built heritage, and particularly historic buildings that are not in active use, may not be in a robust condition due to lack of maintenance, which makes them more vulnerable to external threats such as storms, flooding, or earthquakes. Current weather conditions resulting from climate change are exacerbating their vulnerability. In other cases, the buildings may be in historically strategic or culturally significant locations, such as on riverbanks, which, in turn, exposes them to the hazards of flash floods. Ethnic minority populations also face greater vulnerabilities, in part as a result of development initiatives that may not be culturally or socially suitable for their contexts. From an administrative point of view, a general lack of documentation of cultural practices and heritage amounts to a structural vulnerability of the sector that makes the exercise of preparing for and responding to emergencies more challenging, particularly when indigenous knowledge about coping with disasters is disrupted.

Damage

The vast majority of facilities reported damaged by the floods are temples and stupas (Buddhist reliquary structures). An essential element of traditional Buddhist cultural heritage in Lao PDR, these are the structures most visible and most valued by the majority of Lao people. Every village has at least one temple, which is the center of nearly all activities in the lives of the villagers. If it is severely damaged or destroyed, the fabric of the life of the community is likewise strongly affected. In Xaithani District, Vientiane Capital, several of the small stupas in the temple of Ban Thansahang containing the bones of the villagers' ancestors were damaged and the bones inside them crushed. Two temple compounds in two villages in Sanamxay District, Attapeu, stand out as the most severely damaged. In one, the vihan, or primary sanctuary, was completely destroyed. In the other, the vihan remained standing, but most of the other structures in the compound were flattened.

With regard to intangible cultural heritage, communities in villages with flooded or destroyed temples reported not being able to participate in important annual festivals that took place during July, August, September, and October—for example, the beginning and end of Buddhist Lent and Boun Khao Salak (Ancestor Festival). In terms of movable cultural objects, collections of Buddhist images and precious manuscripts stored in temples were also damaged or lost. In one of the temples in Sanamxay District, the entire set of valuable Buddha images and palm leaf manuscripts was washed away. Reported losses to cultural industries include weaving (see above), among others, while the extent of damage to facilities or equipment associated with such industries needs further investigation.

It is important to note that the assessment of damage to built heritage, movable heritage, intangible heritage, and cultural industries requires more intensive research and data collection than the time frame of this post-disaster needs assessment (PDNA) permitted. The PDNA, therefore, reflects a minimal level of damage, with the expectation that more may be reported in the coming months of recovery. Similarly, it is important to underscore the difficulty of assessing the damage (and also losses) linked with intangible cultural heritage. In Sanamxay District, for instance, traditional medicine is very important for the villagers. There, traditional medical manuals and the traditional herbs and medicines, as well as the equipment needed for practice, were all washed away. It is nearly impossible to attach

Photo credit: Sengaloun Thongsavath.

Damaged Temple at Vat Ban Mai, Sanamxay District, Attapeu Province.

Photo credit: Souvanhnikone Phatanh.

The damage at Vat Ban Hinlad, Sanamxay District, Attapeu Province.

Losses

Nearly all reported losses are linked to the loss of income caused by the damage or destruction of temples or the cessation of certain craft activities. In Sanamxay, the most affected district, no actions have yet been taken to safeguard establishments or begin cleanup activities because the populations have been resettled in temporary housing and are not permitted to return to their villages.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON CULTURE

The social impact of the damage and losses is seen most vividly in six villages in Sanamxay District, Attapeu Province. The level of damage to these villages ranged from severe to extreme, and all villagers were resettled into temporary shelters, which are drastically different in setting, layout, and function from their homes. The villagers have lost their social, cultural, and ritual spaces along with their homes and daily belongings.

The inhabitants of three of the six villages are lowland Lao and practicing Buddhists. In losing their homes in the floods, they also lost their temples and, consequently, the religious spaces for conducting the ceremonies and festivals that form part of the annual ritual cycle. The Lao also have pre-Buddhist ritual spaces inside and around the villages, such as the "village pillars" and sacred forests with their spirit houses. These also were lost.

One way to resolve the sense of depression and feelings of loss reported among these communities is to enable them to restore their religious and ritual activities as quickly as possible. Some members of the temporary communities are beginning to participate in activities at temples in nearby villages. The loss of their individual village spaces, however, will not be remedied until the people are resettled into permanent villages.

The villagers in the other three communities belong to the Oy ethnic group. Already having experienced a loss of cultural identity when they moved out of their traditional villages in the forests many decades ago, they are once again, in the aftermath of the floods, experiencing disruption to their social well-being and cohesion.

The social impact in the other provinces of Lao PDR affected by the floods is much less severe. This is because the level of damage to their villages, temples, and cultural spaces was minor to moderate. Nonetheless, even in places with little to no damage to cultural buildings or infrastructure, rice fields have been flooded and the current harvest lost. The lack of a rice harvest will affect these communities' cultural lives and ritual activities and impair their ability to contribute to the repair of their village temples.

RECOVERY STRATEGY AND NEEDS FOR CULTURE

More comprehensive data are needed for the Lao culture sector in the form of inventories of cultural heritage in all forms, notably built heritage, collections, and intangible cultural heritage. These data would serve both as a permanent record in cases of total destruction and as a baseline for monitoring and assessing damage in the future. The severe flooding in the Attapeu villages, for instance, washed away valuable temple collections and all elements of the villagers' lives, including many items associated with their intangible cultural heritage, such as musical instruments and traditional objects and clothing. Losing these materials underscores the urgency of taking inventory of local culture. Similarly, except for registers of World Heritage sites and nationally important heritage sites, few inventories exist that list and assess the condition of the built heritage in each province.

Table 21 — Damage and Losses (billion Lao kip) to Culture by Sub-sector

SUB-SECTOR	DAMAGE			LOSSES			
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL	TOTAL EFFECTS
Built heritage sites; other forms of immovable tangible heritage	9.77	0.00	9.77	0.10	0.00	0.10	9.87
Infrastructure associated with heritage sites	0.30	0.00	0.30	0.00	0.00	0.00	0.30
Movable properties and collections and their repositories*	--	--	--	--	--	--	--
Intangible cultural heritage and cultural industries	0.00	0.03	0.03	0.12	0.03	0.15	0.18
Cultural public administration	0.02	0.00	0.02	0.00	0.00	0.00	0.02
SECTOR TOTAL	**10.08**	**0.03**	**10.11**	**0.22**	**0.03**	**0.25**	**10.36**

*Quantitative data not available.

Table 22 — Damage and Losses (billion Lao kip) to Culture by Province

PROVINCE	DAMAGE			LOSSES			
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL	TOTAL EFFECTS
Vientiane Capital	0.34	0.00	0.34	0.04	0.01	0.05	0.39
Phongsaly	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Luangnamtha	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cultural public administration	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bokeo	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Luangprabang	0.59	0.00	0.59	0.00	0.00	0.00	0.59
Huaphanh	0.80	0.00	0.80	0.00	0.00	0.00	0.80
Xayaboury	0.14	0.00	0.14	0.06	0.00	0.06	0.20
Xiengkhuang	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vientiane Province	0.03	0.00	0.03	0.00	0.00	0.00	0.03
Borikhamxay	0.37	0.00	0.37	0.00	0.00	0.00	0.37
Khammuane	4.35	0.00	4.35	0.03	0.00	0.03	4.38
Savannakhet	0.27	0.00	0.27	0.00	0.00	0.00	0.27
Saravane	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sekong	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Champasack	0.00	0.00	0.00	0.00	0.00	0.00	0
Attapeu	3.20	0.03	3.23	0.08	0.02	0.10	3.33
Xaysomboon	0.00	0.00	0.00	0.00	0.00	0.00	0
TOTAL	**10.08**	**0.03**	**10.11**	**0.22**	**0.03**	**0.25**	**10.36**

These various proposed heritage inventories, together with the restoration and safeguarding work planned for both short and long terms, should be undertaken in a participatory manner. Furthermore, work should be in line with the 1972 Convention (World Heritage) and the 2003 Convention (Intangible Cultural Heritage), along with relevant instruments to which Lao PDR is signatory, with the former being particularly important with regard to recovery at World Heritage or Tentative List sites.

The destruction of three ethnic Oy villages in the floods in Sanamxay District draws attention to urgent short-term needs to assess, document, and safeguard their already vulnerable culture. The Oy, however, are but one group among many, and their situation underscores that of ethnic groups in other parts of Lao PDR whose cultures are at risk of disappearing and vulnerable to future disaster events.

The recovery strategy recognizes the need to develop DRM strategies and plans. Although during the current disaster half the provinces did not report any damage affecting the culture sector, climate change, heavier rainy seasons, and predictions of increased numbers of tropical storms make preparation for potential future events essential. Developing a series of DRM workshops that involve not only heritage managers and local government officials but the communities themselves will help guarantee heritage sites are better prepared for future disasters, and that communities have the knowledge and skills to respond to them.

Cross-Cutting Issues

Culture and cultural heritage do not only consist of World Heritage sites, historical monuments, and traditional songs and dances. They comprise those elements that identify a people, including language, social structure, religious beliefs, and traditional knowledge, among others. Culture underpins the identity of a country and the people living in it and plays a vital role in the social cohesion of communities. It provides the resilience needed to face, endure, and overcome disasters. Although the culture sector within the PDNA for Lao PDR is classified under the social sector, culture, in reality, is a cross-cutting issue that should be considered within all other sectors. It encompasses, for example, people's beliefs about health and affects how they will respond to suggested treatment; it influences the way houses are built; and it is a factor that shapes community and social spaces.

The vulnerability of women as a population also cuts across other sectors. During recovery, attention should be given to generating livelihood activities for women. Women are also at risk for unsafe migration to neighboring countries, especially Thailand, in search of income opportunities, especially if their existing livelihoods are disrupted by disaster events.

Ethnic groups are also vulnerable populations. All of Lao PDR has significant ethnic diversity, but identities and cultures are often overlooked. Based on the assessment conducted among the Oy villages in Attapeu, it is recommended that assessment and development of recovery strategies in all sectors take ethnicity into account. This is to ensure the recovery strategies are culturally sensitive and appropriate linguistically and socially—for instance, in the provision of replacement housing, education, and other social services, whether in the short or long term. The need to provide essential services sometimes conflicts with the cultural and social needs of the different ethnic groups. Although these conflicts cannot always be resolved, it is, nonetheless, important to try.

CULTURE METHODOLOGY

The post-disaster needs assessment for the culture sector used a rapid assessment mixed methods approach. A standard survey form in Lao language based on UNESCO's materials and in line with PDNA scope was used to collect data in four areas: (1) built heritage and other forms of immovable tangible heritage; (2) movable properties and collections and their repositories; (3) intangible cultural heritage, in combination with cultural industries; and (4) cultural institutions. The survey form was sent to the provincial Department of Information, Culture, and Tourism (DICT) in each of 14 provinces, directed to the attention of the heritage officer. Methodological guidance was provided by the trained members of the national team, and the results were consolidated and analyzed.

To enhance the accuracy of the damage data and facilitate recovery needs assessment, and because the number of affected cultural properties was relatively small, an estimate was made of the damage to each property instead of a calculation of the damage to infrastructure using unit rates. The form facilitated collection of comparative economic data on damage and losses, as well as qualitative information.

Limited fieldwork conducted in Attapeu, Champasack, Savannakhet, and Khammuane combined interviews with local heritage officials and community members with onsite assessments to allow for quantitative as well as social and human impact considerations. Although the team was able to obtain data from all provinces on damage to tangible heritage resources (including built heritage and, to some extent, collections), limited access to remote districts hampered data collection in the provided format. In these cases, the provincial DICTs used a reporting format other than the standard survey form. Data collection also faced challenges imposed by the lack of time, baseline data, and capacity in the provinces.

Table 23 — Recovery and Reconstruction Needs in Culture Sector

SHORT-TERM RECOVERY NEEDS (ONE YEAR)			
SUB-SECTOR	**PROGRAM OF ACTIVITY**	**VALUE (BILLION LAO KIP)**	**RESPONSIBLE AGENCIES**
Infrastructure associated with heritage sites	Luangprabang: Repair and improve damaged or weakened embankments along the Nam Khan River.a	116.20	Luang Prabang World Heritage Office
Built heritage; other forms of immovable tangible heritage	Attapeu: Restore Vat Ban Hinlad.	1.96	DICT, MICT/DOH
	Attapeu: Restore Vat Ban Mai.	1.26	DICT
	Luang Prabang World Heritage: Repair damage at Phousi (slope, chapel).	0.32	Luang Prabang World Heritage Office
	All other provinces: Carry out emergency repair and stabilization of damaged properties and restoration of high-priority damaged temples, stupas, sacred caves, and other cultural heritage sites.	3.30	DICT, MICT/DOH
Movable properties, collections, and repositories	Provide technical support for salvage of damaged collections. Only after initial assessments can a decision be made as to what kind of expertise, if any, is needed.	0.83	DICT, MICT/DOH
Intangible cultural heritage (ICH) and cultural/creative industries	Attapeu: Set up emergency ICH recovery fund for six affected villages.	0.30	DICT, Sanamxay District
	Attapeu: Train Oy indigenous communities in affected villages to document ICH using the UNESCO community-based ICH methodology. Training will include a module on DRM and awareness raising.	0.40	DICT, MICT/DOH
	Attapeu: Support transmission to youth of vulnerable Oy ICH traditions, particularly music.	0.20	DICT, MICT/DOH
SUBTOTAL SHORT-TERM		**8.57**	
MEDIUM-TERM RECOVERY NEEDS (TWO YEARS)			
Built heritage; other forms of immovable tangible heritage	Attapeu: Support community repair of spirit houses.	0.35	DICT, MICT/DOH
	Attapeu: Replant sacred forests with community support.	0.50	DICT
	Attapeu: Support community rebuilding of sacred village shrines.	0.06	DICT
	Champasack World Heritage: Conduct a study to mitigate flooding and erosion of Ancient City.	1.66	Vat Phou World Heritage Office
	Champasack World Heritage: Conduct a study to stabilize slope of Vat Phou hillside.	0.83	Vat Phou World Heritage Office
	Luang Prabang World Heritage: Conduct a study of structural issues at Vat That Luang and other vulnerable structures.	0.83	Luang Prabang World Heritage Office
	All other provinces: Conduct a study of structural issues at vulnerable, high-value structures.	4.15	DICT, MICT/DOH
	All provinces: Complete restoration of damaged temples, stupas, sacred caves, and other cultural heritage sites.	4.59	DICT, MICT/DOH

Movable properties, collections, and repositories	Provide technical support for recovery and repair of damaged collections. This includes identifying the appropriate expertise where necessary.	0.83	DICT, MICT/DOH
Intangible cultural heritage and cultural/ creative industries	Provide financial support for recovery of damaged equipment for cultural industries (e.g., weaving).	1.66	DICT, MICT/DOH
SUBTOTAL MEDIUM-TERM		**15.46**	
LONG-TERM RECOVERY NEEDS (TWO TO FIVE YEARS)			
Built heritage; other forms of immovable tangible heritage	Build DRM capacity and strengthen planning for cultural heritage, prioritizing World Heritage and Tentative List sites. Participants will include heritage managers, museum managers, members of the local communities, and other relevant local stakeholders.	1.66	MICT/DOH, DICT, provincial World Heritage offices
	Undertake multiyear inventory and condition assessment project to document and assess significant built heritage of Lao PDR, to create a database at the national level and set up a heritage register in each province. Include structures on the provincial, national, and World Heritage lists. Assess risk levels of structures. Participants will include not only relevant professionals but also community members and other local stakeholders.	16	MICT/DOH, DICT, provincial World Heritage offices
Movable properties, collections, and repositories	In conjunction with monks, create comprehensive inventory of Buddhist artifacts in temples in all provinces.	4.15	DICT, MICT/DOH
	Update and expand existing palm leaf manuscript inventory across all provinces.	4.15	National Library
Intangible cultural heritage and cultural/ creative industries	Build capacity and support for conducting community-based ICH inventories in affected provinces (starting with Attapeu, Oudomxay, Saravane, and Khammuane). This participatory training will include a module on DRM specifically targeting ICH.	1.60	DICT, MICT/DOH
SUBTOTAL LONG-TERM		**27.56**	
TOTAL		**51.59**	

a This amount is accounted under infrastructure sector needs.

Note: DICT = Department of Information, Culture, and Tourism; DOH = Department of Heritage; DRM = Disaster Risk Management; ICH = intangible cultural heritage; MICT = Ministry of Information, Culture, and Tourism.

Photo credit: Assessment team

Flooded paddy field in Xaybouly district, Savannakhet Province.

PRODUCTIVE SECTORS

AGRICULTURE

Crops, Livestock, Fisheries, Forestry, and Irrigation

AGRICULTURE SUMMARY

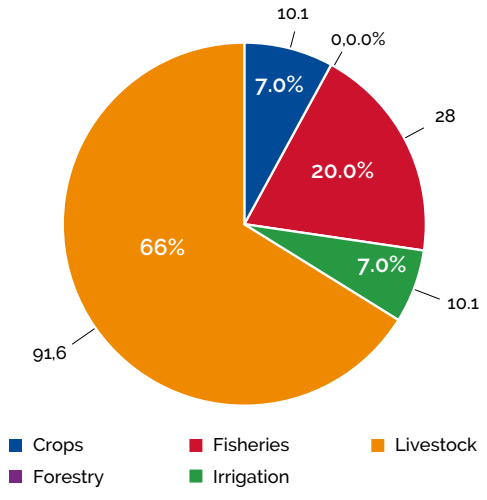
The floods significantly affected the agriculture sector. The damage to the sector overall amounted to 139.8 billion Lao kip and the total of damage and losses to 1,227.3 billion Lao kip. Figure 23 and Figure 24 illustrate the damage and losses incurred by the respective agriculture sub-sectors. The social impact of the floods is presently limited, but household food security, coping ability, and debt management could deteriorate, especially if the next harvest fails. Continuing to monitor the food security of the most vulnerable affected households is important, with food assistance provided in the form of cash, as necessary. Short-term recovery efforts must focus on support in the upcoming dry cropping season and repair and recovery of damaged irrigation systems. In the medium and long terms, climate and disaster resilience and improved disaster management should be supported in all sub-sectors.

AGRICULTURE BACKGROUND

The economy of Lao PDR is largely agrarian, with the agriculture sector accounting for about 16.2 percent of the country's gross domestic product (GDP) and employing about 77 percent of its population. In 2017, the agriculture sector grew by 2.9 percent, reaching 22,801 billion Lao kip, a marginal increase from its growth of 2.8 percent in 2016. Rice and other agricultural crops account for 67.7 percent of the sector, while livestock, fisheries, and forestry account for 12.8 percent, 13.4 percent, and 6.1 percent, respectively. Figure 25 shows the details of Lao PDR's agricultural activities as a share of GDP in 2017.

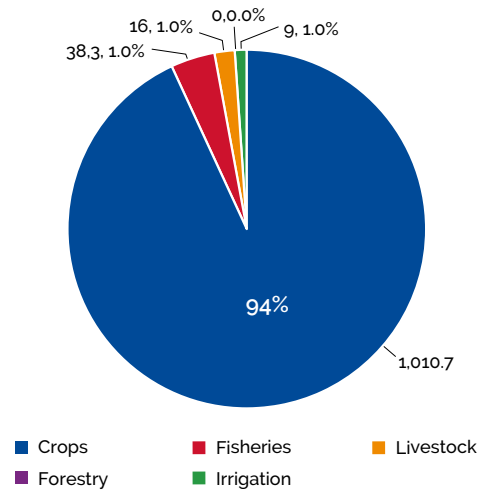
In recent years, agricultural production has gradually increased its contribution to the economy of Lao PDR, strengthening livelihoods and reducing poverty for its people. Figure 26 shows more detail on crop production between 2005 and 2017. Although the commercialization of agriculture has increased gradually, most products are not processed to generate added value. As a result, they generate lower incomes than possible, in particular for the smallholder farmers and producers. Current investment in agricultural processing and the addition of value, as well as linkages to higher-end markets, remain limited.

Figure 23 — Damage (billion Lao kip) to the Agriculture Sector



Source: MoES provincial survey data, 2018.

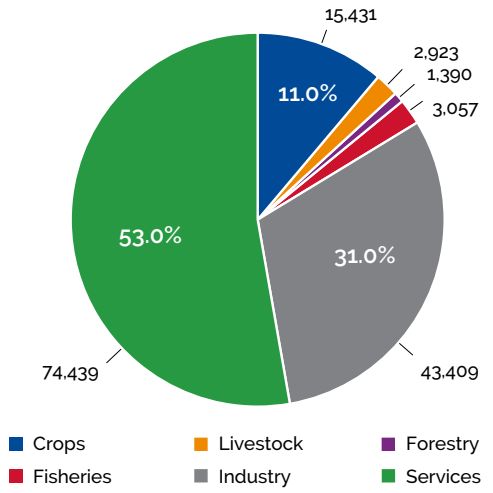
Figure 24 — Losses (billion Lao kip) to the Agriculture Sector



In 2017, rice was the main crop in Lao PDR, accounting for 55.2 percent of the total agricultural cropping area, with rain-fed lowland and upland rice cultivation accounting for 43.7 percent and 6.1 percent, respectively. In the past 12 years, cattle and buffalo production increased, on average, by 13 percent and 9 percent per year, respectively, while pig and poultry production increased by 17.7 percent and 15.5 percent. In 2017, inland and river fisheries and aquaculture reached a production of 109,818 tons, a significant increase from 72,000 tons in 2005. Table 24 provides an overview of the livestock and fisheries sub-sectors.

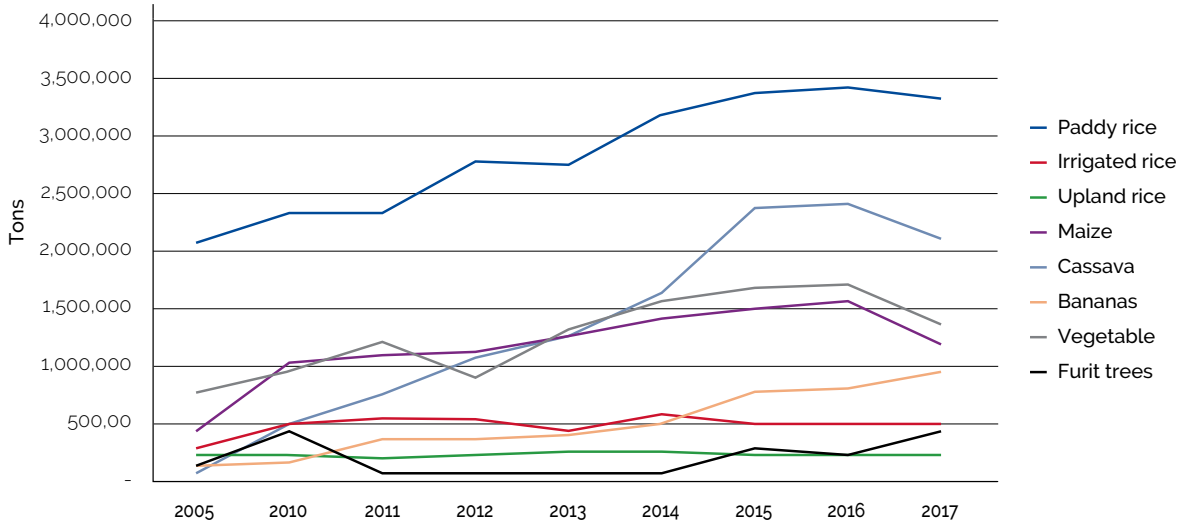
The annual report of the Department of Irrigation (DOI) shows that in the 2017 wet season, a total of 15,119 irrigation schemes were operated to irrigate 255,369 hectares of rice and 28,072 hectares of other crops. During the 2017–18 dry season, an additional 155,552 hectares were irrigated.

Figure 25 — Lao PDR's GDP by Activities in 2017 (billion Lao kip)



Source: Ministry of Agriculture and Fisheries, Lao PDR Statistics Yearbook 2017, 2018.

Figure 26 — Rice and Other Selected Crops Production in Lao PDR between 2005 and 2017



Source: Ministry of Agriculture and Fisheries, Lao PDR Statistics Yearbook 2017, 2018.

Table 24 — Livestock, Fisheries, and Aquaculture Production, 2005 and 2017

REGION	LIVESTOCK (THOUSAND HEADS)					FISH AND AQUACULTURE (TONS)
	CATTLE	BUFFALO	PIGS	GOATS AND SHEEP	POULTRY	
North	507	282	1,345	240	10,689	15,795
Central	1,093	581	1,069	246	11,104	74,604
South	385	326	1,456	101	15,166	19,419
Total in 2017	1,985	1,189	3,870	587	36,959	109,818
Total in 2005	1,272	1,095	1,826	190	19,810	72,000
ANNUAL INCREASE (PERCENT)	**13.0**	**9.0**	**17.7**	**25.7**	**15.5**	**12.7**

Source: Ministry of Agriculture and Fisheries, Lao PDR Statistics Yearbook 2017, 2018.

ASSESSMENT OF DISASTER EFFECTS ON AGRICULTURE

The floods affected the agriculture sector in all provinces of Lao PDR, but the magnitude of the impact varied among and within provinces. In the more mountainous parts of the country, damage was mainly caused by flash floods that washed away crops and livestock. In the lower-lying areas along the major rivers, paddy rice areas were especially affected, with additional crops damaged by standing floods. Continual heavy rains caused rivers to overflow their banks, flooding bordering plains and fields. Standing water that remained in the fields for several weeks led to rotting rice and crops, resulting in the total destruction of crops in the worst affected areas. An estimated 2,733 villages and 128,890 households comprising 745,681 people were reported to have been affected. Table 25 provides an overview of damage and losses to the agriculture sector by sub-sector, while Table 26 provides an overview by province.

Damage

Crops: A total of 102,481 hectares of crops were totally destroyed by the floods, while an additional 30,481 hectares were damaged (see Table 27). Of the affected land, most had been planted with paddy rice. Additionally, floods and heavy rains affected upland rice cultivation, leading to lower yields. Among other crops, maize, cassava, and vegetables were destroyed and damaged.

Finally, agricultural land (as opposed to crops), comprising paddy, coffee, and vegetable land, was completely destroyed, mainly by landslides and erosion caused by the flood waters.

In the largest affected areas in low-lying flood plains, where water levels rose gradually, farmers had time to move farm equipment and stored inputs to higher ground, resulting in little damage to these supplies. An exception was Sanamxay District in Attapeu Province, where six villages, including their farm equipment, stored inputs, and other infrastructure, were destroyed in a flash flood resulting from the breakage of a saddle dam. In this particular case, farmland was also covered by a thick layer of mud, varying from a few to more than thirty centimeters of deposit. Attapeu, Khammuane, and Savannakhet were the provinces worst affected by crop and land damage, with land damage calculated at 10.1 billion Lao kip.

Livestock: Considering the magnitude and scale of the floods, relatively few farm animals died, but variations among provinces were significant. Overall, livestock deaths amounted to 3,183 cattle, 2,068 buffalo, 2,184 pigs, 998 goats, and some 61,289 heads of poultry. Most livestock deaths occurred in Sanamxay District, Attapeu Province, which alone suffered 12.7 billion Lao kip out of a total of 28 billion Lao kip in damage to livestock as a result of the flash flood following the breakage of the saddle dam. The second worst damage to livestock occurred in Vientiane Province, resulting from damage to pasture and grassland. **Fisheries and Aquaculture:** More than 23 million fingerlings were lost to the floods, 42 percent of them in Vientiane Capital, followed by 14 percent in Oudomxay Province. No significant damage was reported to equipment or infrastructure.

Forestry: Because of the nature of the floods, the impact on the forestry sector was limited. Flash floods affected the more densely forested highlands, while standing floods affected mainly crops and agriculture along the riverbanks and basins. Some trees along valleys and streams were also affected. The more stagnant water following the floods in the plains did not have sufficient force to uproot and shift trees, however. Total damage to the forestry sub-sector is calculated at 10.1 billion Lao kip.

Irrigation: The damage to the irrigation infrastructure was significant, with a total of 363 irrigation schemes affected. The most affected provinces were those with extensive irrigation infrastructure, such as Vientiane Capital and Vientiane Province, although not all observed damage can be attributed to the floods. Based on field observations, the heads and intakes of irrigation schemes in particular were affected, incurring roughly 70 percent of observed damage, while the canal systems incurred only 15 percent. The remaining 15 percent of observed damage was considered preexisting. The damage to the irrigation system is calculated at 91.6 billion Lao kip, all affecting the public domain. A more detailed technical assessment is recommended to identify exact damage and repair costs.

Table 25 — Damage and Losses (billion Lao kip) to Agriculture by Sub-sector

SUB-SECTOR	DAMAGE			LOSSES			TOTAL DAMAGE AND LOSSES
	PUBLIC	PRIVATE	TOTAL EFFECTS	PUBLIC	PRIVATE	TOTAL EFFECTS	
Crops	0	10.1	10.1	0	1,010.7	1,010.7	1,020.7
Fisheries	0	0	0	0	38.3	38.3	38.3
Livestock	0	28.0	28.0	0	16.0	16.0	44.0
Forestry	10.1	0	10.1	0	0	0	10.1
Irrigation	91.6	0	91.6	0	22.6	22.6	114.2
TOTAL	**101.6**	**38.1**	**139.8**	**0**	**1,087.6**	**1,087.6**	**1,227.3**

Table 26 — Damage and Losses (billion Lao kip) to Agriculture by Province

PROVINCE	DAMAGE			LOSSES			TOTAL DAMAGE AND LOSSES
	PUBLIC	PRIVATE	TOTAL EFFECTS	PUBLIC	PRIVATE	TOTAL EFFECTS	
Vientiane Capital	3.5	0.9	4.5	0	211.1	211.1	215.54
Phongsaly	4.3	0.5	4.8	0	7.3	7.3	12.14
Luangnamtha	2.7	0.2	2.8	0	15.4	15.4	18.28
Oudomxay	1.4	0.2	1.5	0	54.1	54.1	55.68
Bokeo	2.6	--	2.6	0	6.2	6.2	8.88
Luangprabang	8.3	0.6	8.9	0	22.0	22.0	30.95
Huaphanh	9.9	0.1	10.0	0	32.4	32.4	42.38
Xayaboury	2.5	0.0	2.5	0	3.7	3.7	6.19
Xiengkhuang	9.2	0.3	9.5	0	11.1	11.1	20.60
Vientiane Province	7.0	7.0	13.9	0	63.6	63.6	77.52
Borikhamxay	3.9	0.7	4.7	0	93.4	93.4	98.08
Khammuane	7.2	1.7	8.8	0	215.2	215.2	224.06
Savannakhet	10.0	0.3	10.2	0	237.3	237.3	247.55
Saravane	0.9	0.7	1.6	0	4.7	4.7	6.31
Sekong	6.1	0.7	6.9	0	9.4	9.4	16.28
Champasack	5.1	4.5	9.6	0	83.0	83.0	92.61
Attapeu	11.7	19.4	31.1	0	17.1	17.1	48.18
Xaysomboon	5.5	0.2	5.7	0	0.4	0.4	6.09
TOTAL	**101.6**	**38.1**	**139.8**	**0**	**1,087.6**	**1,087.6**	**1,227.3**

Table 27 — Levels of Damage to Crops and Land (in hectares)

	CROPS DESTROYED	CROPS DAMAGED	LAND DAMAGED
Wet paddy rice	89,849	26,239	3,387
Upland rice	1,055	3,094	0
Maize	3,825	3	0
Cassava	2,367	988	0
Vegetables	2,776	125	352
Other crops	3,739	32	0
TOTAL	**102,481**	**30,481**	**3,739**

Losses

Crops: The losses to crops from the floods were several times larger than the damage, with losses resulting from the missed harvest, particularly of paddy rice, especially significant. The destruction of wet paddy comprised 11.4 percent of the total planted area. With an average yield of 4.39 tons per hectare, this amounted to a total loss of 394,437 tons of paddy rice. Damage to crops still standing in the fields represented 3.4 percent of the total paddy area planted in the 2018 wet season, which reduced the yield to an estimated 75 percent of the usual average yield, or an estimated loss of 28,797 tons. In all, the paddy rice crop incurred losses of 722.5 billion Lao kip,[44] while upland rice incurred an additional loss of 10.9 billion Lao kip.

Losses to other crops are estimated at 25.1 billion Lao kip for maize, 18.25 billion Lao kip for cassava, 112.1 billion Lao kip for vegetables, 26.1 billion Lao kip for coffee, and 30.7 billion Lao kip for fruit trees (mainly oranges), plus a total of 1 billion Lao kip in losses to other, minor crops, adding up to an estimated 277.2 billion Lao kip in losses to crops other than rice. Overall, 0.641 billion Lao kip for land clearing have been included in these calculations. The direct total losses to crops amount to 1,010.7 billion Lao kip.

In addition, most of the damaged irrigation systems may not be repaired by November 2018 in time to support the dry paddy season cultivation, which will result in the loss of the 2019 dry season harvest. About 33,671 hectares of the affected paddy land is under irrigation and normally planted for a second crop. While no exact figures are available for land under individual irrigation schemes that was damaged to the extent of not being planted this year, it is estimated at least one-third (11,224 hectares) of the irrigated paddy land will not be planted this coming dry season. This would result in an additional estimated loss of close to 56,344 tons of paddy rice, with an estimated farm-gate value of 140.3 billion Lao kip.

Livestock: Losses to livestock are generally considered in terms of reductions in productivity. With most of the animals raised for meat production and not milk, no detailed information is available about productivity levels for meat, milk, or eggs, so these were not taken into consideration (although these losses exist to a certain extent at the household level). Normally, however, harvest residue would be fed to the livestock, and they would graze the fields after the harvest. With damage to the paddy fields reducing the amount of grazing residue, livestock might be affected and become weaker and more susceptible to diseases, potentially resulting in increased mortality rates—a situation that would continue until the next harvest. A calculation based on an estimated increased mortality of some 2 percent of the flood-affected livestock population predicts an estimated 16 billion Lao kip in losses.

Fisheries and aquaculture: The losses in fisheries are associated with washed-away fingerlings and seedlings and lost income from the reduced sale of fish and are valued at some 38.3 billion Lao kip.

Forestry: Losses in the forestry sub-sector are hard to quantify, as most of the benefits from forest do not enter the formal economy. In the damaged forest areas, reduced availability and collection of non-timber forest products such as firewood, wild vegetables, or roots is expected but cannot be valued in terms of monetary loss.

Irrigation: Irrigation systems remaining unrepaired during the upcoming dry cropping season (2018–19) will result in fee payments and incomes not being raised. The expected loss in this regard is an estimated 22.6 billion Lao kip.

44. As the paddy rice market prices differ significantly across provinces, individual province-level prices have been used for the calculation of losses according to location, rather than a national average price.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON AGRICULTURE

Damage and losses to the agriculture sector often result in subsequent reduction of income, food insecurity, and undernutrition in the short and medium terms. To establish an understanding of the impact of the floods on households' economy and food security, additional data were collected during the field component of the post-disaster needs assessment (PDNA) in five selected provinces: Luangprabang, Vientiane Capital, Khammuane, Savannakhet, and Champasack. Over the past decade, a series of nationwide studies have created a comprehensive picture of the normal food security situation in Lao PDR, which is used as a baseline for comparisons with the current situation in the flood-affected areas.[45] Even in normal times, an estimated 14.2 percent of the rural population is food insecure, of whom 13.1 percent are moderately food insecure and 1.1 percent severely food insecure.[46]

45. These studies are by the World Food Programme (WFP) and include the 2007 Lao PDR: Comprehensive Food Security and Vulnerability Analysis; the 2013 Food and Nutrition Security Atlas of Lao PDR; and the unpublished 2017 Comprehensive Food Security Assessment Report, 2015–16.

46. WFP, Comprehensive Food Security Assessment Report 2015–16, 2017.

Photo credit: Assessment team

Different scale of flooding damage in Sanasomboun District, Champasack Province.

Photo credit: Assessment team

Damaged irrigation system in Khammuane Province.

Fruit tree and vegetable garden flooded in Pakou District, Luangprabang Province.

Community discussions facilitated during the PDNA evaluated a number of food security and livelihood indicators. Household dietary diversity and food groups consumed in the previous 24 hours were discussed with 79 focus groups. On average, the lowest tercile of the households consumed foods from between four and seven food groups, while the highest tercile consumed foods from between ten and the maximum of twelve food groups. Table 28 illustrates a clear distinction between the northern two provinces (Luangprabang and Vientiane Capital) and the central and southern provinces (Khammuane, Savannakhet, and Champasack). Table 28 provides an overview of the population's food diversity by province and tercile.

Additionally, parameters like the Food Insecurity Experience Scale and Coping Strategy Index were discussed. At the time of the focus group discussions, participants had experienced only a general trend of no food insecurity to light food insecurity, with a few cases of moderate food insecurity and fewer than 10 percent reporting severe food insecurity (see Table 29). While an important percentage of focus groups reported adoption of less severe coping strategies (like borrowing food or eating less preferred and less expensive foods), some households limited their portion sizes, and adults in Khammuane and Luangprabang provinces restricted their consumption to allow children to eat or reported a reduction in number of meals consumed per day (see Table 30).

Borrowing money is a common coping strategy. Outstanding debts were reported at normal levels for this time of the year by 70 percent of focus group participants. Most often, loans are taken out to buy agriculture inputs (73 percent) but also for investment (53 percent) and expenditures related to health (39 percent) and schooling (37 percent). About two-thirds (65 percent) of focus group participants were worried that the level of debt they had built up would affect their capacity to borrow in the future, while 59 percent worried their inability to take out additional loans resulting from their inability to pay back outstanding debt after this wet season could affect their future agricultural production.

While some 82 percent of the focus groups pariticipants expressed worry regarding a lack of household income as a result of the floods, 89 percent reported that paddy farming was not their only source of income. Among focus groups, 90 percent said seasonal migration to find work was a common practice.[47] Even so, 62 percent indicated more than usual migration plans this year because of the crop failure and loss of income.

It remains to be seen whether the increased availability of labor by farmers who now have no fields to harvest will bring down labor wages in other—not directly flood-affected—areas and sectors of the country and will have an impact on household economies. While current social impacts from the floods seem to be manageable, the evolution of household income (and debt), food security, and nutrition in light of the current levels of coping and food insecurity should be carefully monitored over the next six months, until households have completed the next harvest, to prevent a deterioration of livelihoods and increased poverty levels.

47. Most labor-related migration is domestic within Lao PDR (79 percent), with Thailand as a second option (59 percent), especially for the central and southern provinces. Most popular are jobs in construction (73 percent) and industry (65 percent), with average remuneration of around 56,000–65,000 Lao kip per day, and higher when working abroad.

Table 28 — Household Dietary Diversity Scores by Province

PROVINCE	FOOD GROUPS CONSUMED (PERCENTAGE)			NO. OF FOCUS GROUP DISCUSSIONS
	LOWEST TERCILE 4–7 FOOD GROUPS	MIDDLE TERCILE 7–9 FOOD GROUPS	HIGHEST TERCILE 10–12 FOOD GROUPS	
Luangprabang	11	22	67	18
Vientiane Capital	8	15	77	13
Khammuane	56	22	22	18
Savannakhet	33	53	13	15
Champasack	45	55	0	11
TOTAL	**33**	**34**	**33**	**75**

Source: Data derived from focus group discussions.

Table 29 — Food Insecurity Experience of Households by Province

PROVINCE	LEVEL OF FOOD INSECURITY EXPERIENCED BY HOUSEHOLDS (PERCENTAGE)				NO. OF FOCUS GROUP DISCUSSIONS
	NONE	LIGHT	MODERATE	SEVERE	
Luangprabang	39	50	6	6	18
Vientiane Capital	48	38	5	10	21
Khammuane	52	43	0	5	21
Savannakhet	--	--	--	--	--
Champasack	8	92	0	0	12
OVERALL	**37**	**53**	**5**	**5**	**59**

Source: Data derived from focus group discussions.

Note: Data for Savannakhet were invalid due to collection error.

Table 30 — Households Adopting Coping Strategies to Overcome Food Shortages by Province

PROVINCE	HOUSEHOLDS ADOPTING STRATEGIES (PERCENTAGE)					
	RELYING ON LESS PREFERRED, LESS EXPENSIVE FOODS	BORROWING FOOD OR RELYING ON HELP FROM FRIENDS/ RELATIVES	LIMITING PORTION SIZE AT MEALTIMES	RESTRICTING CONSUMPTION BY ADULTS FOR CHILDREN	REDUCING NUMBER OF MEALS IN A DAY	NO. OF FOCUS GROUP DISCUSSIONS
Luangprabang	24	24	0	6	6	17
Vientiane Capital	25	13	0	0	0	8
Khammuane	33	24	10	14	10	21
Savannakhet	--	--	--	--	--	--
Champasack	0	33	0	0	0	12
OVERALL	**32**	**29**	**9**	**13**	**5**	**58**

Source: Data derived from focus group discussions and based on the Reduced Coping Strategy Index (RCSI).

Note: Data for Savannakhet were invalid due to collection error.

RECOVERY STRATEGY AND NEEDS FOR AGRICULTURE

The agriculture sector has been heavily hit with significant damage and losses to its production systems across the five main sub-sectors. While immediate support is needed for the dry season crop production, medium- and long-term systematic approaches must address vulnerabilities of farming households, the agricultural system, and watershed management in the country; Table 31 provides an overview of the recovery needs detailed below.

Short-Term Recovery Needs (One Year)

The first priority in the short term should be preventing deterioration of the food security of the approximately 128,890 households (745,681 persons) affected by the floods, with special attention paid to the poorest and most vulnerable, estimated (depending on the province) at 10–20 percent of the population. This effort should include landless laborers who might not have lost assets or crops to the floods but suffer from the loss of labor opportunities—and thus income—from the destruction of landowners' fields. Cash transfers as food assistance to the most vulnerable households for six months until the harvest in April 2019 could provide the necessary purchasing power to ensure essential nutritional requirements of all household members are met and protect remaining assets. Learning and linkages to the medium- and long-term recommendations for improved social safety nets should be documented with the Department of Social Welfare under the Ministry of Labor and Social Welfare.

Dry season crop cultivation inputs and support should be provided to the affected farming households at least until cultivation for the next harvest in either the winter dry or summer wet season, depending on whether the community and households have access to rain-fed or irrigated cropland. Timely provision of seeds and fertilizers will be crucial for the 2018–19 dry season, starting soon. Additionally, households with small land holdings and landless households should be supported with vegetable gardening inputs to enhance their food production and access to diverse foods. Support for household debt management and capacity to repay outstanding loans should be considered.

The **livestock sub-sector** should immediately be supported with forage and supplementary fodder in the affected areas for at least six months until the next harvest (in irrigated areas) or until the rainy season can naturally produce new pastures. Veterinary care and vaccination services should also be made immediately available to prevent any additional losses from increased livestock morbidity and resulting mortality. The replacement of lost poultry can be considered during this short-term recovery, accompanied by supplementary fodder and vaccination services.

Similarly, support to the **fisheries and aquaculture** sub-sector should consider the replacement of fingerlings and the provision of feed to restock fish ponds. In selected locations where flooding has damaged fish ponds, support for repair of these structures could be considered through a public work scheme or safety net component. More flood-resistant construction designs could support the "build back better" principle in the fisheries sub-sector.

Investment in the rehabilitation of the damaged **irrigation infrastructure** is critical, taking a comprehensive approach to ensure stability and the resilience of the system to future disasters. The priority of repairing and rehabilitating the affected irrigation schemes in time to avoid additional dry season cultivation losses is, however, somewhat in conflict with that of properly reviewing the designs to make the irrigation system more resistant to increasing climate-related disasters. A more detailed technical assessment is recommended to identify damage more exactly and improve estimates of repair and improvement costs for the irrigation system. In light of the magnitude of this work, irrigation costs and recovery elements are spread across the calculations for the short- and medium-term time frames and recovery needs.

Medium-Term Recovery Needs (Two Years)

In the medium term, the **agriculture production** system will need further support to recover fully and be built back better. Additional crop inputs for the 2019 wet season and 2019–20 dry season will need to be considered for the most affected areas because of differences in cultivation practices and choice of varieties. Given these differences, support should be considered for multiple seasons to get the crop sub-sector back on track.

Table 31 — Recovery and Reconstruction Needs in Agriculture by Sub-sector

SHORT-TERM (ONE YEAR)			
SUB-SECTOR	**RECOVERY PRIORITIES**	**COST (BILLION LAO KIP)**	**RESPONSIBLE AGENCIES**
Crops	Provision of agriculture inputs for the upcoming dry season and wet season crops.	35.9	DOA/PAFOs/ DAFOs
Fisheries	Provision of fingerlings and fish inputs, and, potentially some working scheme for rehabilitation.	42.4	DLF/PAFOs/ DAFOs
Livestock	Provision of supplementary fodder and veterinary services to protect surviving animals. Replacement of poultry, including fodder and vaccination services.	2.9	DLF/PAFOs/ DAFOs
Forestry	N/A		
Irrigation	Rehabilitation of affected irrigation infrastructure (head works and canals)	34.0	DOI/PAFOs/ DAFOs
Food assistance (cash)	Immediate food assistance for six months until next harvest season in April 2019, to avoid deterioration of food and nutrition security situation for the affected population.	116.3	
SUBTOTAL SHORT-TERM		**231.5**	
MEDIUM-TERM (TWO YEARS)			
Crops	Provision of agriculture inputs for the wet season crops.	20.6	DOA/PAFOs/ DAFOs
Fisheries	N/A		
Livestock	Replacement of small and large ruminants, including fodder and vaccination services. Provision of active pasture management and production, including improved fodder storage and post-harvest management.	60.2	DLF/PAFOs/ DAFOs
Forestry	N/A		
Irrigation	Rehabilitation of affected irrigation infrastructure (head works and canals), and review of the watershed management system and approach.	16.2	DOI/PAFOs/ DAFOs
Early warning systems	Design and implementation of a regular food and nutrition security monitoring system and climate disaster–related damage and losses reporting systems.	TBD	DMH/ MONRE/ NDPCC/DSW
Social protection system	Review of the national social protection system/policy and establishment of a disaster response component and operating procedures.	TBD	MLSW/MAF
Agriculture statistics	Review and design of appropriate agriculture statistics systems, including regular damage and losses reporting for all agriculture sub-sectors, for improved disaster resilience and prevention.	TBD	MAF/LSB
SUBTOTAL MEDIUM-TERM		**97.0**	
LONG-TERM (TWO TO FIVE YEARS)			
Crops	N/A	-	
Fisheries	N/A	-	
Livestock	N/A	-	
Forestry	N/A	-	
Irrigation	Rehabilitation of affected irrigation infrastructure (head works and canals).	28.8	DOI/PAFOs/ DAFOs
Overall agriculture sector	Addressing of climate change adaptation and resilience building of the agriculture sector through support of the implementation of 2025 Agriculture Development Strategy and Vision 2030.		MAF
SUBTOTAL LONG-TERM		**28.8**	
TOTAL		**357.30**	

Note: DOA= Department of Agriculture (of MAF), PAFOs = Provincial Agriculture and Forestry Office; DAFO = District Agriculture and Forestry Office; DLF = Department of Livestock and Fisheries (of MAF); DOI = Department of Irrigation; DMH = Department of Meteorology and Hydrology; MONRE = Ministry of Natural Resources and Environment; NDPCC = National Disaster Prevention and Control Committee; DSW = Department of Social Welfare; LSB = Lao Statistics Bureau; MAF = Ministry of Agriculture and Forestry; MLSW = Ministry of Labour and Social Welfare

The replacement of small and large ruminants should be addressed after the anticipated full recovery of pasturelands during the 2019 rainy season. Ideally, active pasture management and sowing can be promoted during the next wet season to build the pastures back better, including through improved post-harvest fodder storage and management. Irrigation system rehabilitation and repair will continue into the medium term.

Improved **watershed management** and agricultural system resilience approaches should be identified and explored during this time, through feasibility studies and strategy development, pilot projects, and subsequent rollout and scale up. The advancement of **social protection systems** and safety net approaches, including agricultural insurance schemes and improved food security and climate disaster **early warning systems**, should be strengthened. Given the magnitude of the damage and losses to the agriculture sector, an agriculture statistics system and a **regular damage and losses reporting system** should be reviewed and considered to improve the active and informed decision-making processes in the sector.

Long-Term Recovery Needs (Two to Five Years)

Long-term recovery calls for applying a policy and system strengthening approach, building back better, and supporting the agriculture system and sector to become more climate and disaster resilient. Reviews and feasibility studies conducted under the medium-term recovery activities should now be implemented and scaled up. Achievement of the 2025 Agriculture Development Strategy and Vision 2030 should be supported, further strengthening the productivity and resilience of the agriculture system in Lao PDR.

AGRICULTURE METHODOLOGY

The PDNA agriculture working group comprises staff members of Ministry of Agriculture and Forestry (MAF), Lao Statistics Bureau, Food and Agriculture Organisation (FAO), the Japan International Cooperation Agency (JICA), World Food Programme (WFP), and World Vision International (WVI). The agriculture sector field data collection team includes staff members of MAF, Provincial Agriculture and Forestry Office (PAFO), and District Agriculture and Forestry Office (DAFO) in respective provinces, FAO, WFP, and WVI.

Damage and losses calculations are based on figures provided by the MAF PAFO offices. Luangprabang, Vientiane Capital, Khammuane, Savannakhet, and Champasack were prioritized for field verification and visits. For the remaining provinces, the MAF data were used and remotely verified with support from PAFO and DAFO. In each province, two to four of the most affected districts, chosen with PAFO, were visited. In each district, two to four communities or villages were visited and community discussions facilitated. In total, 79 focus group discussions were held (26 female only, 35 male only, and 18 mixed), with a total of 898 participants. Observational walks were facilitated after the group discussions to verify any damage and losses incurred by the respective communities.

Social impacts: The same focus group discussions in the same provinces as those described above were included in the fieldwork to assess the magnitude of the impact of the floods. The discussions provided an opportunity to gain an understanding of the impact of the floods on food security and livelihoods. The report from the rapid assessment carried out in Attapeu Province in August 2018 was also used to inform reflection on the social impact component.[48]

The assessment faced some limitations. These included constraints on time and resources, as a result of which only five provinces were visited; limited representativeness of household-level data gathered only through focus group discussions; and questions regarding data quality for Savannakhet Province, which showed many outliers and flags and were not included in the tables and comparisons above.

48. Ministry of Agriculture and Fisheries, Joint Rapid Assessment, 2018.

TOURISM

TOURISM SUMMARY

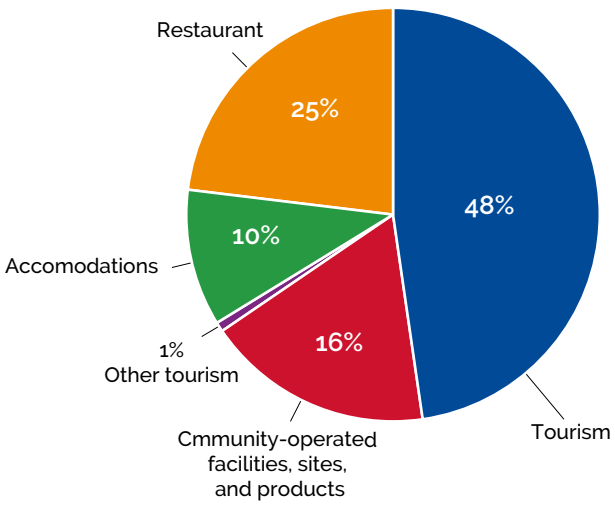
Damage and losses from the floods varied within the tourism sector, depending on the province and the nature of the floods. 13 provinces reported damage, while 12 reported losses. Those suffering the most damage were Attapeu, Vientiane Capital, and Champasack, while the greatest losses were in Attapeu, Vientiane Capital, and Borikhamxay.[49] Because the private domain dominates the tourism industry, it suffered most in both respects. Affected were hotels, guesthouses, resorts, restaurants, and community-based tourism activities, such as homestays, among others. Some natural sites that are part of tourism concessions were also damaged. The private domain was most affected in the provinces of Attapeu, Vientiane Capital, Xiengkhuang, Huaphanh, and Oudomxay.[50]

In general, the proposed recovery and reconstruction strategy strives to address the needs and concerns of the private domain and the communities, while also providing more comprehensive, sector-wide assistance to the tourism divisions within the Ministry of Information, Culture, and Tourism (MICT) and to each provincial Department of Information, Culture, and Tourism (DICT) in their efforts to respond to and enhance preparedness for disasters.

TOURISM BACKGROUND

The tourism industry has long been recognized as a vital engine for economic growth in Lao PDR. By 2016, tourism was designated as one of the Lao government's eight priority programs for socioeconomic development and was so acknowledged in the National Tourism Strategy for 2016–25.[51] Since as early as the 1990s, the country's abundant natural and cultural resources have been seen as key to tourism's development, and they have been accordingly promoted and developed.

Figure 27 — Reported Damage and Losses to the Tourism Sector



These resources have included Lao PDR's historically important sites, as well as the cultural diversity of its ethnic groups. Surveys conducted by the Tourism Development Department have shown that most visitors to Lao PDR, especially affluent ones, come because of the rich and varied cultural and natural attractions.

Statistics on tourist arrivals collected over the past 25 years clearly underscore the increased importance of tourism to the Lao economy. In 1990, only 14,400 tourists arrived in the country. By 2005, arrivals had increased to 1,095,315, and by 2017, they had reached 3,868,838. In addition, the average length of stay of international visitors increased from 3.5 days in 1993 to 8.39 days in 2017.[52]

49. Listed in the order of impact.

50. Listed in the order of impact. Cultural sites are accounted for in culture chapter.

51. Ministry of Information, Culture, and Tourism, Tourism Development Department, Tourism Research Division, 2017 Statistical Report on Tourism in Lao PDR 2017, 6, www.tiigp-laos.org/downloads/other/LAO%20PDR%National%2-Destinations%Management%20Plan%2-2016=2018.pdf.

52. Ibid.

In general, most international visitors to Lao PDR come from neighboring countries. Thais still constitute nearly 50 percent of all arrivals, but a Chinese market is growing. The European market is very small—only 4.1 percent in 2017. Europeans spend disproportionately more money in Lao PDR than other visitors, however. Lao domestic tourists are a smaller but growing market. They currently constitute a little more than 30 percent of the entire tourism market. In part to compensate for the decrease in international arrivals, and in acknowledgment of a growing middle class in Lao PDR, recently proposed marketing strategies are targeting the domestic market more and more. Improved infrastructure and better transportation options have also helped.

Accommodation establishments and rooms have proliferated dramatically in Lao PDR since 2011. From 1,926 that year, the number of hotels, guesthouses, and resorts rose to 2,734 in 2017, while available rooms went from 32,960 to 50,600.[53] Most are in Champasack and the town of Luang Prabang, where the country's two UNESCO World Heritage sites are located. The Vat Phou and Associated Ancient Settlements are within the Champasack Cultural Landscape, while Luang Prabang, along with Vientiane Capital and Vientiane Province, hosts Vang Vieng, a highly popular natural destination.

Revenue from tourism has also greatly increased, from US$2,250,000 in 1991 to US$725,365,543 in 2015. Although 2016 and 2017 saw decreases to US$724,191,957 and US$648,067,008, respectively, reflecting dips in tourist arrivals, the sector has experienced growth overall. The direct contribution of tourism to Lao PDR's gross domestic product rose to 5 percent of total GDP in 2014, with a dip to 4.2 percent in 2017. In 2016, the industry supported 118,000 jobs, or 3.7 percent of total employment, decreasing to 114,000 jobs, or 3.5 percent of total employment, in 2017, with the latter still a significant contribution. Despite the recent declines, the Tourism Development Department and the Tourism Marketing Department of Lao PDR remain confident that the tourism sector will return to its upward trends. Since tourism statistics for the first three quarters of 2018 have not yet been released, however, any effects of the flood on visitor arrivals and the overall tourism market are still unclear.

ASSESSMENT OF DISASTER EFFECTS ON TOURISM

For tourism, the distinction between the public and private domains is an important one. In Lao PDR, the private domain by far owns and manages the most tourism facilities. These include not only a range of accommodations, restaurants, and entertainment venues, but also community-based enterprises, such as homestays and a variety of shops, large and small, that sell souvenirs, food, beverages, and other items to tourists. Moreover, the private domain operates many tourism sites through concessions.

Damage

The amount of damage to the tourism sector differed from province to province, with some five provinces reporting no damage at all. It also varied according to the nature of the flooding, with Sanamxay District, Attapeu Province, suffering the most serious damage from a dam break. Besides Attapeu, Vientiane Capital, Champasack, Xiengkhuang, Oudomxay, Borikhamxay, and Huaphanh[54] incurred the most damage.

The value of both damage and losses to the private domain was much higher than to the public domain. As Table 32 clearly shows, the former bore more than 10 times the damage the latter did. In fact, 93 percent of the reported damage came from the private domain. Many tourism facilities located along rivers and waterways were damaged when embankments overflowed during the storms and resulting floods.

Nearly half the reported damage and losses for the entire private domain in Lao PDR was incurred by a single private concession. An important component of the tourism sector, a private concession exists when a private investor purchases the development and operation rights to a particular land area for a specified period of time—usually 50 years—with an option for renewal. The concession facilities at the Xae Pa and Xae Pong Lai waterfalls in Attapeu, which were directly downstream from a dam, were heavily damaged when the dam collapsed, with the internal road and other facilities for visitors completely destroyed.

53. Ibid.

54. Listed in order of impact.

Table 32 — Damage and Losses (billion Lao kip) to Tourism by Sub-sector

SUB-SECTOR	DAMAGE			LOSSES		
	PUBLIC	PRIVATE	TOTAL EFFECTS	PUBLIC	PRIVATE	TOTAL EFFECTS
Accommodation	0.00	1.14	1.14	0.00	1.97	1.97
Restaurants	0.00	4.04	4.04	0.00	3.93	3.93
Tourism sitesa	1.39	11.00	12.38	0.63	1.98	2.61
Community-operated facilities, sites and productsb	0.00	4.14	4.14	0.00	1.00	1.00
Other tourism facilities	0.16	0.00	0.16	0.09	0.00	0.09
TOTAL	**1.55**	**20.32**	**21.87**	**0.72**	**8.87**	**9.59**

a These are primarily natural sites; most cultural and historical sites are covered by the chapter on the culture sector. The figures include last-mile access roads to tourist sites. The primary tourist site that was damaged was the Xae Pa/Xae Pong Lai waterfall concession. The detailed costs include the following:

- Restaurant 3,845,846,467
- Guesthouse (9 rooms) 1,287,211,166
- Guest bungalows (9 units) 1,219,882,996
- Dormitory for employees (4 buildings, 8 rooms each) 865,188,937
- Public toilets (20 stalls) 562,383,933
- Salas (huts for relaxing) (40 units) 398,000,000
- Landscaping 152,804,600
- Internal road and parking area 580,591,200
- Subtotal 8,911,909,299
- Tax 810,171,457
- Administrative costs 116,644,733
- Total 9,838,725,489

b The cost for community-operated facilities included the cost of repairs to six houses in Ban Mai, Sanamxay District, that hosted homestays and equipment needed by the house owners for their community-based tourism, including replacement of 12 boats that took visitors to the waterfalls. Each boat (plus engine) cost 7 million Lao kip.

Source: Based on data collected by the Tourism Development Department team during the fieldwork and as reported by eacn provincial Department of Information, Culture, and Tourism.

Photo credit: Sengalon Thongsavath

Xe Pong lai Waterfall, showing the damaged area at the base of the waterfall, Sanamxay District, Attapeu Province.

Losses

In general, losses to the tourism sector from the floods occurred primarily because of revenue lost when facilities closed and staff had to be laid off and lost their salaries. Tourism operators likely also had losses because of higher operating costs, additional costs associated with providing access to tourism sites (for example, temporary bridges), and temporary higher costs of electricity, water, and other services. Road closures, for instance, likely led to higher transportation costs, while extensive damage to rice crops around the country is expected to have a knock-on effect on operating costs for hotels and restaurants. No quantitative figures had yet been reported for these types of losses at the time of writing, but the presumed impacts have been taken into consideration in formulating the proposed recovery measures. Table 32 and Table 33 detail the numbers and types of facilities damaged and the extent of their damage and losses.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON TOURISM

The social impact of the damage and losses to the tourism sector includes hardships placed on the individuals and families who either operate or work in the various facilities affected by the floods. Community-based tourism ventures and homestays are more at risk after such disasters because they often lack the resources to sustain themselves during the crisis period or lack the funds to rebuild. Examples in Lao PDR include the community-based tourism project in Nam Et Phou Louey, National Protected Area in Huaphanh, and the six homestays in Ban Mai in Sanamxay, Attapeu.

With regard to gender differences in the social impact of the floods, women who work in the tourism industry frequently have the lesser-paid jobs, such as housekeeping in hotels and guesthouses. If a facility closes, these jobs will be most at risk, whereas managers, who are more than likely men, will be kept on during the time of the disaster. The women, are, thus, more at risk for seeking riskier employment options elsewhere, or for unsafe migration.

Table 33 — Damage and Losses (billion Lao kip) to Tourism by Province

PROVINCE	DAMAGE			LOSSES		
	PUBLIC	PRIVATE	TOTAL EFFECTS	PUBLIC	PRIVATE	TOTAL EFFECTS
Vientiane Capital	0.00	4.46	4.46	0.00	1.84	1.84
Phongsaly	0.00	0.00	0.00	0.00	0.00	0.00
Luangnamtha	0.00	0.10	0.10	0.00	0.17	0.17
Oudomxay	0.00	0.47	0.47	0.00	1.07	1.07
Bokeo	0.00	0.00	0.00	0.00	0.00	0.00
Luangprabang	0.09	0.00	0.09	0.00	0.00	0.00
Huaphanh	0.04	0.32	0.35	0.04	0.49	0.52
Xayaboury	0.00	0.00	0.00	0.00	0.00	0.00
Xiengkhuang	0.13	0.94	1.07	0.00	0.06	0.06
Vientiane Province	0.00	0.05	0.05	0.00	0.57	0.57
Borikhamxay	0.00	0.46	0.46	0.00	1.52	1.52
Khammuane	0.29	0.05	0.34	0.26	0.44	0.69
Savannakhet	0.00	0.00	0.00	0.00	0.00	0.00
Saravane	0.00	0.00	0.00	0.00	0.00	0.00
Sekong	0.00	0.14	0.14	0.00	0.24	0.24
Champasack	1.00	0.33	1.33	0.42	0.39	0.81
Attapeu	0.00	12.90	12.90	0.00	2.03	2.03
Xaysomboon	0.00	0.10	0.10	0.00	0.07	0.07
TOTAL	**1.55**	**20.32**	**21.87**	**0.72**	**8.87**	**9.59**

Source: Based on data collected by the Tourism Development Department team during the fieldwork and as reported by provincial Departments of Information, Culture and Tourism.

Table 34 — Recovery and Reconstruction Needs in the Tourism Sector

SHORT-TERM RECOVERY NEEDS (ONE YEAR)			
SUB-SECTOR	**PROGRAM OF ACTIVITY**	**VALUE (BILLION LAO KIP)**	**RESPONSIBLE AGENCIES**
Accommodation	All provinces: Repair/reconstruction of damaged accommodations	1.37	Private domain, DICT, MICT/TMD
Restaurants	Attapeu: Recovery of damaged restaurants	0.34	Private domain, DICT, MICT/TMD
	Other provinces: Repair/reconstruction of damaged restaurants	4.51	Private domain, DICT, MICT/TMD
Tourism sites	Attapeu: Recovery of Xae Pa/Xae Pong Lai waterfall concession, including new community crafts market	11.30	Private domain, DICT, MICT/TDD
	Attapeu: Repair of 15 km road leading to Xae Pa/Xae Pong Lai waterfall concession	0.00*	Provincial government, MICT/TDD
	Other provinces: Repair/reconstruction of damaged public tourism sites, including last-mile access roads to sites	1.67	Provincial government, DICT, MICT/TDD
	Other provinces: Repair/reconstruction of damaged private tourism sites	2.40	Provincial government, MICT/TDD
Community-operated facilities, sites, and products	Attapeu: Repair/reconstruction of damaged community-based tourism operations in Ban Mai	3.70	Communities, DICT, MICT/TDD
	Other provinces: Repair/reconstruction of damaged community-based tourism operations	1.27	Communities, DICT, MICT/TDD
Other tourism facilities	Attapeu: Development of tourism facilities at Vat Ban Hinlad and Vat Ban Mai	3.00	DICT, MICT/TDD
	All provinces: Repair/reconstruction of damaged tourism facilities	0.19	Private domain, DICT, MICT/TDD
Tourism sector-wide support	Support for marketing campaign to build confidence in tourism sector in Lao PDR	1.00	MICT/TMKD
SUBTOTAL SHORT-TERM		**30.75**	
MEDIUM-TERM RECOVERY NEEDS (TWO YEARS)			
Tourism sites	Attapeu: Tourism and marketing promotion plan for Sanamxay District	0.26	MICT/TDD, MICT/TMKD
	Attapeu: Tourism development and management plan for Sanamxay District	0.10	DICT, MICT/TDD
Community-operated facilities, sites, and products	Attapeu: Support for livelihood opportunities for four villages to open jobs at and provide food supplies to Xae Pa/Xae Pong Lai waterfall concession and provide tourism awareness training	0.75	DICT, MICT/, MCTI, MICT/TMD
	Attapeu: Support for community-based tourism at Ban Tamoryod near Xae Pa/Xae Pong Lai waterfall (homestay, crafts market).	1.80	DICT, MICT/TDD
	Attapeu: Support for recovery of affected community-based tourism in Ban Mai village	3.00	DICT MICT/TDD
Tourism sector-wide support	Development of and capacity building in Disaster Risk Management for public and private tourism operators	0.58	MICT/TMD
	Development and capacity building in tourism crisis communication for public and private tourism operators	0.25	MICT/TMKD, MICT/TMD
	Development of and capacity building in "build back better" for public and private tourism operators	0.42	MICT/TMD
	Strengthening of networking and communication channels among tourism operators, including dissemination of early warnings	0.21	MICT/TMD
SUBTOTAL MEDIUM-TERM		**7.37**	

LONG-TERM RECOVERY NEEDS (TWO TO FIVE YEARS)			
Tourism sites	Attapeu: Connection of Xae Pa/Xae Pong Lai waterfalls to larger tourism circuit in Champasack (Pakxong, etc.)	0.06	MICT/TDD MICT/TMKD
Tourism sector-wide support	Policy consultations to support tourism operators through innovative financing mechanisms (reduction/waiver of business tax, reduction/waiver in import duties on construction materials, soft loans, reduction/waiver of concession fees)	0.17	MICT/TDD, MICT/TMD
SUBTOTAL LONG-TERM		**0.23**	
TOTAL		**38.35**	

*Funding in the amount of 37.35 billion Lao kip that is required for repairing 15 km road leading to Xae Pa/Xae Pong Lai waterfall concession is included under the transport sector.

Notes: MICT = Ministry of Information, Culture, and Tourism; TDD = Tourism Development Department; TMD = Tourism Management Department; TMKD = Tourism Marketing Department; MCTI = Mass, Culture, and Tourism Institute; DICT = Department of Information, Culture, and Tourism.

RECOVERY STRATEGY AND NEEDS FOR TOURISM

The recovery strategy strives to address the needs and concerns of the private domain and the communities, as well as provide more comprehensive, sector-wide assistance to the tourism departments within the MICT and each provincial DICT. It is expected that most of the private domain damage and losses will be absorbed by the private domain itself, although the Government of Lao PDR may consider innovative policy changes to facilitate its recovery—for example, reduction or waiver of business taxes; reduction in import duties on construction materials needed for repairs; soft loans; and reduction or waiver of concession fees. Community-based tourism operations do not, however, have the resources to recover without direct outside assistance. For these small businesses, financial support and technical assistance are needed from MICT or development partners investing in pro-poor tourism.

Finally, it is important to raise awareness about and build capacity to handle disasters in the future, in terms of preparedness as well as response. This is proposed to be done through developing operational manuals and capacity building in Disaster Risk Management, tourism crisis communication, and building back better aimed at public and private domain tourism operators. A strong understanding of the tourist sector in Lao PDR—for example, the preference for building tourism facilities in attractive locations along rivers—is important to recognizing opportunities to develop the principle of "build back better" and to inform disaster risk prevention and mitigation planning. As part of building back better, tourism operators will be encouraged to use green technologies, which will also increase their self-reliance in case of disruption of services, such as electricity.

TOURISM METHODOLOGY

This sectoral assessment used a rapid assessment mixed methods approach. A standard survey form in Lao language was used to collect data on damage and losses in both the private and public domains of tourism. The private domain fields included hotels, resorts, guesthouses, restaurants, entertainment venues, and "other" fields, in line with government categorization for tourism statistics. Although the public-domain fields can include cultural, historical, and natural tourist sites, tourism information centers, and government offices, this survey placed cultural and historical tourism sites within the culture sector to avoid overlap. Assessment for the tourism sector included only natural sites, tourism information centers, and government offices. The survey form was sent to the DICT in each of 14 provinces, directed to the attention of the heritage officer. Methodological guidance was provided, and the results were consolidated and analyzed.

Limited fieldwork conducted in Attapeu, Champasack, Savannakhet, and Khammuane[55] combined interviews with local heritage officials and community members with onsite assessments to allow for quantitative as well as social and human impact considerations.

Although the team was able to obtain data from all provinces on damage to tourism resources, limited access to remote districts in some provinces hampered data collection in the provided format. In these cases, the provincial DICTs used a reporting format other than the survey form provided. To ensure consistency, these data were incorporated into the consolidated analysis format on losses and damage.

To enhance the accuracy of the damage data and facilitate recovery needs assessment, and because the number of affected tourism properties was relatively small, an estimate was made of the damage to each individual property instead of a calculation of damage to infrastructure using unit rates, as was suggested in the provided template. Because the time frame for collecting the data for this PDNA was limited, we must treat the data as representing the minimum of damage incurred by tourism facilities. The losses were calculated using losses reported for the period when the disaster happened, up to the time of the survey. These were then extrapolated for the estimated period the losses were likely to continue to occur, which depended on the extent of the damage and took into account seasonality in the tourism industry.

55. Listed in order of impact.

Photo credit: Sengalon Thongsavath

Attapeu waterfall tourist sales before the dam broke.

INDUSTRY AND COMMERCE

INDUSTRY AND COMMERCE SUMMARY

The sum of damage and losses to infrastructure and assets in the industry and commerce sector from the floods was estimated at 3.8 billion Lao kip. This does not represent a major reduction of the sector's projected contribution to gross domestic product (GDP) for 2018, which would have accounted for approximately 17.9 percent, or 28.1 billion Lao kip. It is, however, significant for its effect on the workers who have suffered severe income loss. Damage to physical infrastructure and assets in the sector amounts to 0.8 billion Lao kip. Losses, which represent a change in production flows—either as a result of lower revenue or higher operational costs—amount to an estimated 3 billion Lao kip. The total value of the recovery needs for the sector is an estimated 4.7 billion Lao kip.

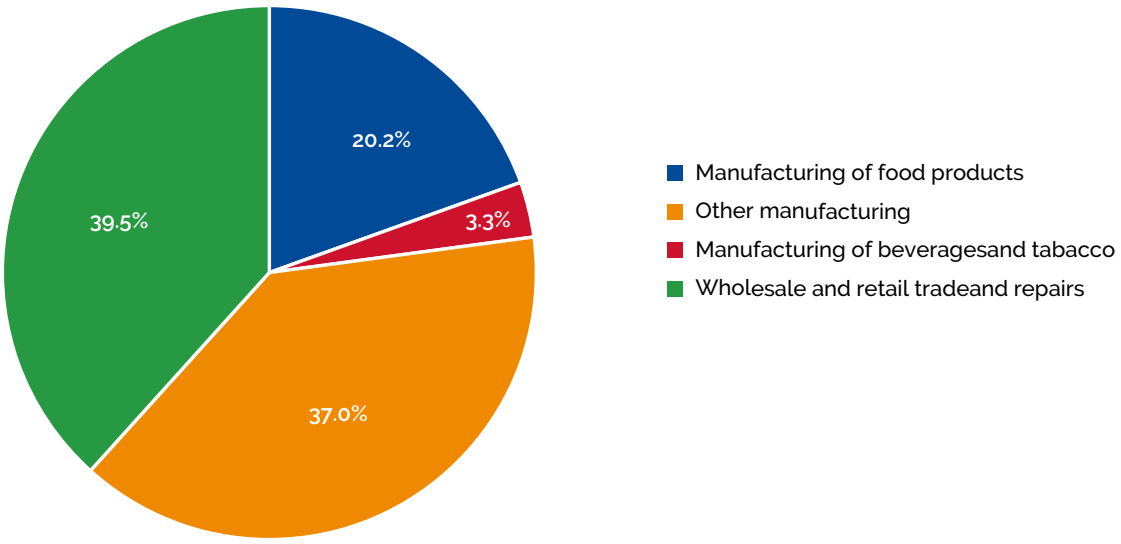
Several short- and medium-term activities are proposed to address these needs. These include low-cost financing mechanisms for small- and medium-sized enterprises (SMEs) to kickstart business and help meet existing loans; the development of incentive schemes to increase insurance participation of SMEs; and the strengthening of capacity in Disaster Risk Management (DRM) among SMEs.

As Figure 28 shows, among the enterprises that reported being affected by the floods, wholesale and retail traders and those involved in repairs accounted for 39.5 percent, while the group involved in "other manufacturing" (such as the manufacture of furniture and building materials) accounted for the second largest group, at 37 percent. The manufacturing of food products accounted for 20.2 percent and the production of beverages and tobacco products for the remaining 3.3 percent.

INDUSTRY AND COMMERCE BACKGROUND

Industry and commerce in Lao PDR represent significant segments of the economy, contributing 30.9 percent and 41.5 percent, respectively, to GDP. According to the 8th National Socioeconomic Development Plan, 2016–20, 100,653 registered enterprises exist across the country, with total registered capital of 1.68 trillion Lao kip (or US$200 billion). Of the registered capital, 86.52 percent is in the industrial sector, 8.72 percent in the service sector, 3.14 percent in construction, and 1.62 percent in agriculture.

Figure 28 — Distribution of Affected Enterprises by Type of Entrepreneurial Activity



Source: Estimates by PDNA team based on data from the Ministry of Industry and Commerce.

Private enterprises account for the vast majority of registered enterprises in Lao PDR, comprising some 99.79 percent (100,473 entities), while state-owned enterprises make up 0.13 percent (131 entities). Of all the enterprises, 95.9 percent (96,531 entities) are domestic, while 2.74 percent (2,758 entities) are foreign. Another 1,184 are joint ventures, accounting for 1.17 percent; 53 are mixed enterprises, accounting for 0.05 percent; and 29 are collective enterprises, accounting for 0.03 percent.

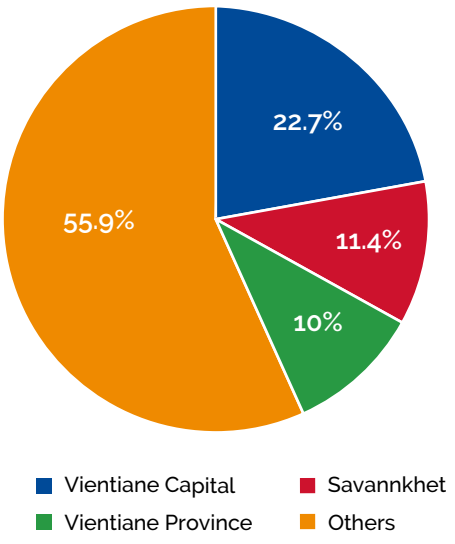
It is important to note that SMEs account for 99.8 percent of all registered enterprises in Lao PDR, and large enterprises for only 0.2 percent (196 entities). SMEs account for the largest share of employees, as well—83 percent, or 286,575 persons. Large enterprises, on the other hand, account for only 17 percent, or 58,513 employees. According to the 2013 Enterprise Survey, the aggregate share of female ownership increased from 36.2 percent in 2005 to 47.5 percent in 2013. The 2017 Enterprise Survey reported that the proportion of firms in Lao PDR with majority female ownership was 43 percent, which was significantly higher than firms in East Asia and the Pacific at 28.6 percent.

In Lao PDR, the prevailing definition used for SMEs is in accordance with the Prime Minister's Decree No. 42, which was officially issued in 2004. The classification of an enterprise is based on the entity's number of employees, the value of its assets, and its annual average turnover. The decree states that "small and medium-sized enterprises are independent establishments which are legally registered and are running their activities in accordance with the laws of Lao PDR." Small enterprises are those with an annual average number of employees not exceeding 19 persons, or total assets not exceeding 250 million Lao kip, or an annual turnover not exceeding 400 million Lao kip. Medium-sized enterprises have an annual average number of employees not exceeding 99 persons, or total assets not exceeding 1.2 billion Lao kip, or an annual turnover not exceeding 1 billion Lao kip.

The post-disaster needs assessment (PDNA) for industry and commerce focused on the SMEs involved in approximately 17.9 percent of the sector's contribution to GDP, as this was the primary group about which and from which information was received. Research suggests SMEs can be found throughout Lao PDR, although they predominate in major cities. Figure 29 presents the spread of SMEs by provinces, andFigure 30 illustrates the range of economic activities in which they are engaged. It should be noted that informality in the sector is high; it has been estimated as slightly above 30 percent, and even this estimate is considered low.[56]

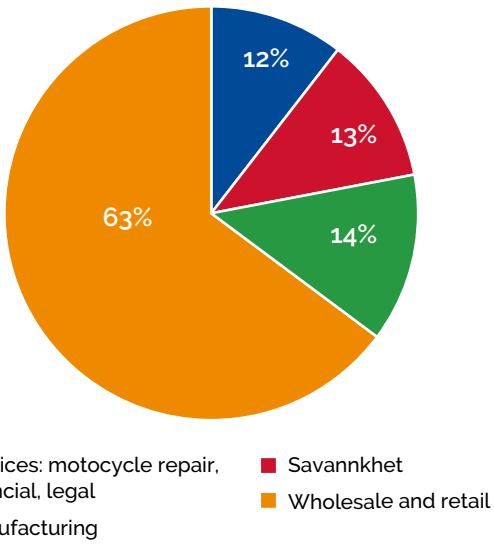
56. World Bank Group, Lao People's Democratic Republic Systematic Country Diagnostic: Priorities for Ending Poverty and Boosting Shared Prosperity (Washington DC: World Bank, 2017).

Figure 29 — Geographical Spread of SMEs in Lao PDR



Source: Ministry of Planning and Investment (MPI).

Figure 30 — Distribution of SMEs by Category of Economic Activity



Source: Ministry of Planning and Investment (MPI).

ASSESSMENT OF DISASTER EFFECTS ON INDUSTRY AND COMMERCE

Overall, damage and losses in the sector were estimated at 3.8 billion Lao kip. Of the enterprises listed in Table 35 that reported being affected by the floods, those involved in industry, such as the manufacturing of goods, accounted for 60 percent of the overall effects, while commercial services accounted for the remaining 40 percent.

Of the provinces that provided data, the most affected was Attapeu, which incurred 50.8 percent of overall damage and losses, followed by Vientiane Capital (24.2 percent) and Khammuane (18.5 percent). Other provinces suffered damage and losses ranging between 2 and 4 percent of the reported overall effects (see Table 36).

Damage

Damage to physical infrastructure and assets in the sector amounted to 0.8 billion Lao kip. The firms to which the largest share of overall effects could be attributed were those involved in wholesale and retail trade, which accounted for 40 percent. They were followed by firms involved in what is classified as "other manufacturing" (such as the manufacturing of furniture; cement, lime and plaster, and clay building materials; wood and products made of wood and cork; articles of straw and plaiting materials; and iron and steel casting), which accounted for 37 percent of the overall effects. Firms involved in the manufacturing of food products and beverages made up the balance.

It is not surprising that the value of damage was less than that of losses, as represented by the change in production flows (see below), as firms have little access to capital for investment purposes and limited capacity in management processes. In the 2016 Enterprise Survey, only 17 percent of manufacturing firms reported buying fixed assets.[57]

Losses

Losses in the sector because of the floods comprised a change in production flows, either as a result of lower revenue or higher operational costs, and amounted to 3 billion Lao kip (see Table 35). Such change could be attributed to a number of flood-related factors. Among entrepreneurs involved in manufacturing, 70 percent identified the unavailability of water utilities and 30 percent electricity as influencing factors. Another challenge faced by many entrepreneurs was sourcing alternatives to inputs to which access was disrupted by the floods to keep their production processes operational—a problem cited by 58.5 percent of those surveyed. Lower customer demand was identified by 57 percent of entrepreneurs in Vientiane Capital and 41 percent in Khammuane Province; especially affected were those involved in wholesale and retail trade and repairs.

Not unexpectedly, consumer demand dropped as incomes decreased because of disruption from the disaster to other sectors, such as agriculture, in which the largest segment of the employed population is engaged. Although information provided on income in any survey is difficult to validate, entrepreneurs reported they expected the significant loss of income and disruption to business processes to last for at least three months after the floods.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON INDUSTRY AND COMMERCE

Because of the large proportion in the sector of workers who are self-employed or engaged in partnerships with no employees, loss of income from between two weeks and three months, as reported in the survey, is significant. Combined with the high proportion of female-owned businesses, family income could be expected to suffer. Families are likely to face significant hardship as they try to meet their everyday needs. Unfortunately, the impact of the event is also likely to slow the efforts of Lao PDR to create more non-farming jobs, as some SMEs may not be able to reenter the market.

57. World Bank Group, Lao Enterprise Survey, 2016.

Table 35 — Damage and Losses (billion Lao kip) to Industry and Commerce by Sub-sector

SUB-SECTOR		DAMAGE	LOSSES	TOTAL EFFECTS
Industry	Manufacturing of food products	0.073	0.691	0.764
	Manufacturing of beverages and tobacco	0.0438	0.081	0.1248
	Other manufacturing	--	1.401	1.401
Services	Wholesale and retail trade and repairs	0.68	0.816	1.496
	Accommodation and food services	--	--	--
TOTAL		**0.8**	**2.99**	**3.78**

Source: PDNA team, based on Ministry of Industry and Commerce (MOIC) data, as reported by provinces.

Note: Where data are missing, none were reported. The difference in total effects between Table 35 and Table 36 is due to rounding.

Table 36 — Damage and Losses (billion Lao kip) in Industry and Commerce by Province

PROVINCES	DAMAGE		LOSSES		TOTAL EFFECTS
	PRIVATE	TOTAL EFFECTS	PRIVATE	TOTAL EFFECTS	
Vientiane Capital	0.07	0.07	0.86	0.86	0.93
Phongsaly	0.07	0.07	--	--	0.07
Luangnamtha	--	--	--	--	--
Oudomxay	0.02	0.02	0.13	0.13	0.15
Bokeo	--	--	--	--	--
Luangprabang	--	--	--	--	--
Hauphanh	0.03	0.03	0.04	0.04	0.07
Xayaboury	--	--	--	--	--
Xiengkhuang	--	--	--	--	--
Vientiane	--	--	--	--	--
Borikhamxay	--	--	--	--	--
Khammuane	--	--	0.71	0.71	0.71
Savannakhet	--	--	--	--	--
Saravane	--	--	--	--	--
Sekong	--	--	--	--	--
Champasack	--	--	--	--	--
Attapeu	0.68	0.68	1.27	1.27	1.95
Xaysomboon	--	--	--	--	--
TOTAL	**0.87**	**0.87**	**3.01**	**3.01**	**3.88**

Source: PDNA team based on MOIC data, as reported by provinces.

Note: No public losses are included. The data were self-reported, and the limited time for the assessment did not allow for site visits to gather data from all the provinces. Where data are missing from the table, none were reported. The difference in total effects between Table 35 and Table 36 is due to rounding.

Table 37 — Recovery and Reconstruction Needs in the Industry and Commerce Sector

SHORT-TERM RECOVERY YEAR)			
SUB-SECTOR	**PROGRAM OF ACTIVITY**	**VALUE (BILLION LAO KIP)**	**RESPONSIBLE AGENCIES**
Commerce			
Wholesale and Retail Trade	Devise short-term, low-cost financing mechanisms for SMEs to support the kickstarting of business and help meet existing loans	1.5	MOIC
MEDIUM-TERM RECOVERY NEEDS TWO TO THREE YEARS)			
Commerce			
Manufacturing	Develop incentive scheme for increased insurance participation of SMEs	2	MOIC
Manufacturing	Strengthen capacity in DRM among SMEs	1.2	MOIC
TOTAL		**4.7**	

Note: DRM = Disaster Risk management; MOIC= Ministry of Industry and Commerce; SMEs = Small and Medium-sized Enterprises.

RECOVERY STRATEGY AND NEEDS FOR INDUSTRY AND COMMERCE

The total value of the recovery needs for the sector was estimated at 4.7 billion Lao kip, pertaining to the short and medium terms. Table 37 provides details on the recovery needs by sub-sector and time period.

Needs for recovery and reconstruction, as defined in the PDNA methodology, do not only address the hard issues of damage to physical assets and infrastructure but the soft and often overlooked issues of identifying financial requirements or needs to ensure the economic recovery of the commerce or trade sector. The recovery strategy should seek to help the sector return to its normal level of functioning and sales processes. It may also require identifying measures to support needs of the affected enterprises to restart operations and, possibly, refinance or reschedule non-performing loans arising from the disaster.

Based on these premises, a number of priorities have been identified:

- Increase insurance coverage to manage future risk better. Almost 100 percent of small businesses surveyed indicated they did not hold insurance.
- Facilitate electricity and water supply availability, particularly to SMEs in the manufacturing sub-sector. SMEs surveyed highlighted the hardship to which the disruption of the water and electricity supply subjected their businesses.
- Increase access to reinvestment financing. At least 57 percent of entrepreneurs surveyed identified the importance of support in this area.
- Provide capacity building in supply chain management. Finding alternative sources of basic inputs was identified as a weakness in the business process.

INDUSTRY AND COMMERCE METHODOLOGY

The assessment used a two-pronged strategy for data collection. For one approach, the Ministry of Industry and Commerce sent out standard forms to provinces to collect data about the extent of damage and losses to affected enterprises. These forms allowed data to be submitted to the Ministry of Industry and Commerce (MOIC) systematically through self-reporting. MOIC sought to validate the data through follow-up telephone calls. Out of 18 provinces, 6 reported data for this exercise, suggesting the impact on firms was widespread across Lao PDR.

The second approach involved a face-to-face survey of 150 respondents, conducted by a research group in one district in each of two provinces. The selection of provinces was based on the initial extent of reported damage and on ease of access; these were Xaythany District in Vientiane Capital and Mahaxay District in Khammuane Province. A purposive sampling technique was used to identify business owners affected by the floods and currently staying in the target districts. The 30-minute, face-to-face interviews were conducted using CS Pro on tablets. Seventy-five were conducted in each province between October 10 and 15, 2018.

The combined approach to data collection resulted in a rich spectrum of information, not only about the extent of damage and losses, but also concerning the state of the enterprises since the event, and it produced possible recommendations for recovery. Both approaches used a single instrument.

Photo Credit: World Bank

Bridge on R3, October 6, 2018.

INFRASTRUCTURE SECTORS

TRANSPORT

TRANSPORT SUMMARY

The floods caused damage to one-fifth of the country's road network, with overall damage to the transport sector estimated at 822.02 billion Lao kip.[58] Mountainous provinces in the north suffered damage from flash floods, while southern provinces were affected by backwater floods (apart from the Sanamxay District in Attapeu, which was affected by flash floods over a longer period as a result of the dam collapse). Losses were mainly incurred in the form of higher vehicle operating costs; loss of revenue to truck and bus operators during periods when roads were cut off; and costs of clearing landslides, carrying out emergency repair work on damaged roads and bridges, and putting in place temporary roads and ferries to restore traffic flow. Losses incurred to district and rural roads were considered minimal, as traffic volumes on these roads are comparatively low. Total losses are estimated at 785.8 billion Lao kip. The total funding needed for recovery is estimated at 2,074.65 billion Lao kip.

Table 38 provides the distribution of damage and losses by province, as well as estimates for meeting short-, medium-, and long-term needs. Key short-term needs include the emergency repair and maintenance of damaged roads and bridges, with priority on critical sections of the road network so normal traffic flow can be restored and emergency support can reach the affected people. In the medium term, periodic maintenance and spot improvements are needed, along with the incorporation of climate resilience principles into the design of these procedures. Long-term needs include climate-resilient road improvements for selected sections of the damaged roads and further improvement of the road sections and bridges most vulnerable to recurring floods so they can withstand future disaster events.

TRANSPORT BACKGROUND

Lao PDR's road density, measured as square kilometers of land area, is about 30 percent lower than the Association of Southeast Asian Nations (ASEAN) average, and closer to that of the Philippines and Myanmar. Because of low population density, however (29 people per square kilometer), its road length per capita is among the highest in ASEAN. Road transport is the predominant mode of transport in Lao PDR, serving nearly 90 percent of total domestic transport, and carries crucial economic weight in the movement of goods and persons.

The Lao PDR road network is classified based on its functionality. The national road is the road connecting the capital Vientiane to provincial centers and international border checkpoints, while provincial roads connect provincial centers to district centers, district roads connect district centers to clusters of villages, and rural roads connect clusters of villages to villages and farms. The total length of the network is 56,382 kilometers, of which 14 percent are national roads, 15 percent are provincial, 12 percent are district roads, 44 percent are rural, and 15 percent are special and urban roads. Of the total, 25 percent are paved (mainly national roads), and 75 percent are gravel and dirt roads. Dirt roads, and particularly district and rural roads, are not built according to engineering standards, which is why, in part, they are vulnerable to flood damage during the rainy season.

The length of roads making up the road network varies from province to province, as shown in Table 39. The overall condition of the network can be characterized as 41 percent in good condition; 22 percent in fair condition; 21 percent in poor condition; and 15 percent in bad condition.

58. This chapter covers only road transport infrastructure, as damage to and losses for inland waterways are addressed in a separate chapter, and no damage was incurred by the aviation and railway sectors.

Table 38 — Overall Damage, Losses, and Needs in the Transport Sector

PROVINCE	DAMAGE		LOSSES		SHORT-TERM NEEDS <1 YEAR		MEDIUM-TERM NEEDS 2–3 YEARS		LONG-TERM NEEDS >3 YEARS		TOTAL NEEDS	
	BILLION LAO KIP	%	BILLION LAO KIP	%	BILLION LAO KIP	%	BILLION LAO KIP	%	BILLION LAO KIP	%	BILLION LAO KIP	%
Vientiane Capital	25.88	3.15	40.99	5.22	14.63	2.51	33.48	5.08	0.00	0.00	48.11	2.32
Phongsaly	31.10	3.78	57.08	7.26	23.55	4.05	42.39	6.45	80.58	9.65	146.52	7.05
Luangnamtha	33.38	4.06	20.98	2.67	62.03	10.66	37.22	5.65	90.12	10.81	189.37	9.13
Oudomxay	44.28	5.39	58.25	7.41	90.61	15.56	58.20	8.84	111.33	13.35	260.13	12.54
Bokeo	20.63	2.51	92.51	11.77	14.11	2.42	65.12	9.89	53.18	6.38	132.41	6.38
Luangprabang	86.46	10.52	118.66	15.10	28.83	4.95	88.66	13.47	80.04	9.60	197.53	9.52
Huaphanh	176.25	21.44	87.89	11.19	60.21	10.34	0.00	0.00	0.04	0.01	60.25	2.90
Xayaboury	60.31	7.34	29.24	3.72	19.73	3.39	19.06	2.89	9.53	1.14	48.32	2.33
Xiengkhuang	76.77	9.34	34.96	4.45	15.62	2.68	53.77	8.16	0.00	0.00	69.39	3.34
Vientiane Province	41.50	5.05	44.86	5.71	19.57	3.36	60.95	9.26	120.05	14.40	200.57	9.67
Borikhamxay	29.91	3.64	11.09	1.41	63.29	10.87	14.52	2.20	0.00	0.00	77.81	3.75
Khammuane	53.05	6.45	15.37	1.96	35.94	6.17	35.80	5.44	0.00	0.00	71.74	3.46
Savannakhet	10.82	1.32	12.25	1.56	46.60	8.00	24.45	3.71	25.90	3.11	96.96	4.67
Saravane	4.37	0.53	2.81	0.36	8.65	1.49	10.68	1.62	3.21	0.38	22.54	1.09
Sekong	7.45	0.91	18.12	2.31	17.74	3.05	24.84	3.77	39.34	4.72	81.92	3.95
Champasack	6.01	0.73	9.87	1.26	41.66	7.16	54.16	8.22	61.87	7.42	157.70	7.60
Attapeu	80.53	9.80	119.03	15.15	4.46	0.77	35.26	5.35	158.75	19.03	198.47	9.57
Xaysomboon	33.31	4.05	11.83	1.49	14.90	2.56	0.00	0.00	0.00	0.00	14.90	0.73
TOTAL	**822.02**	**100.00**	**785.80**	**100.00**	**582.15**	**100.00**	**658.57**	**100.00**	**833.93**	**100.00**	**2,074.65**	**100.00**

Source: Lao PDR Department of Public Works and Transport.

Table 39 — Road Network Data

PROVINCE	ROAD LENGTH (KM) BY ROAD CLASS						TOTAL (KM)
	NATIONAL	PROVINCIAL	DISTRICT	URBAN	RURAL	SPECIAL	
Vientiane Capital	246.05	285.32	487.48	684.67	621.31	100.36	2,425.19
Phongsaly	474.00	206.10	346.72	56.40	1,982.95	891.35	3,957.52
Luangnamtha	299.68	492.88	111.00	105.28	931.68	166.29	2,106.81
Oudomxay	326.50	285.60	589.44	130.96	1,448.33	162.72	2,943.55
Bokeo	174.72	273.35	150.30	88.23	574.37	30.43	1,291.40
Luangprabang	605.20	565.05	356.42	162.55	2,100.37	494.77	4,284.36
Huaphanh	445.00	745.40	768.95	150.11	1,829.09	1,618.29	5,556.84
Xayaboury	549.00	955.50	604.70	248.64	717.79	212.73	3,288.36
Xiengkhuang	436.00	455.21	65.84	71.34	2,328.03	197.30	3,553.72
Vientiane	449.11	603.12	616.12	363.06	818.11	185.33	3,034.85
Borikhamxay	604.95	519.10	327.86	68.91	512.94	45.00	2,078.76
Khammuane	594.16	326.00	403.45	161.07	1,915.03	75.84	3,475.55
Savannakhet	604.00	860.11	426.10	128.79	3,654.68	57.00	5,730.68
Saravane	534.50	192.00	342.34	133.09	1,880.25	50.10	3,132.28
Sekong	216.00	111.80	509.76	86.06	1,034.42	389.50	2,347.54
Champasack	460.83	686.35	473.09	160.56	1,791.22	654.83	4,226.88
Attapeu	355.46	192.83	58.10	167.12	548.06	60.20	1,381.77
Xaysomboon	355.80	499.70	281.54	96.34	195.15	137.20	1,565.73
TOTAL	**7,730.96**	**8,255.42**	**6,919.21**	**3,063.18**	**24,883.78**	**5,529.24**	**56,381.79**

Source: Lao PDR Department of Public Works and Transport, Annual Road Asset Report, 2016.

The Ministry of Public Works and Transport (MPWT) is responsible for managing the road network, but the responsibility for the implementation of road planning, contract management for road construction, and maintenance of provincial, district, and rural roads rests with its provincial Department of Public Works and Transport (DPWT). The transportation services rely mainly on privately owned operators.

ASSESSMENT OF DISASTER EFFECTS ON TRANSPORT

The effects of the floods on the transport sector were largely confined to the road infrastructure system, including road pavement structures, drainage systems, bridges, and culverts. Table 40 summarizes damage and losses by province and ownership. Overall, the public share of the damage and losses is much higher than the private, particularly with regard to damage sustained.

Damage

A total of 9,853 kilometers of road and 656 meters of bridges were damaged in Lao PDR, while 786 meters of bridges were destroyed (see Table 41). A total of 2,085 vehicles, including trucks, cars, motorcycles, and farm trucks, were damaged, mainly in Attapeu.

The northern provinces of Lao PDR largely consist of hilly landscapes, and the road network is built along valleys and follows their uneven topographical features. These provinces suffered from both landslides and flash floods. Provinces in the central and southern parts of the country suffered mainly from flooding, with the majority of road damage incurred by road surfaces, drainage, culverts, and riverbank protection. Table 42 describes the extent of damage to roads and bridges by type.

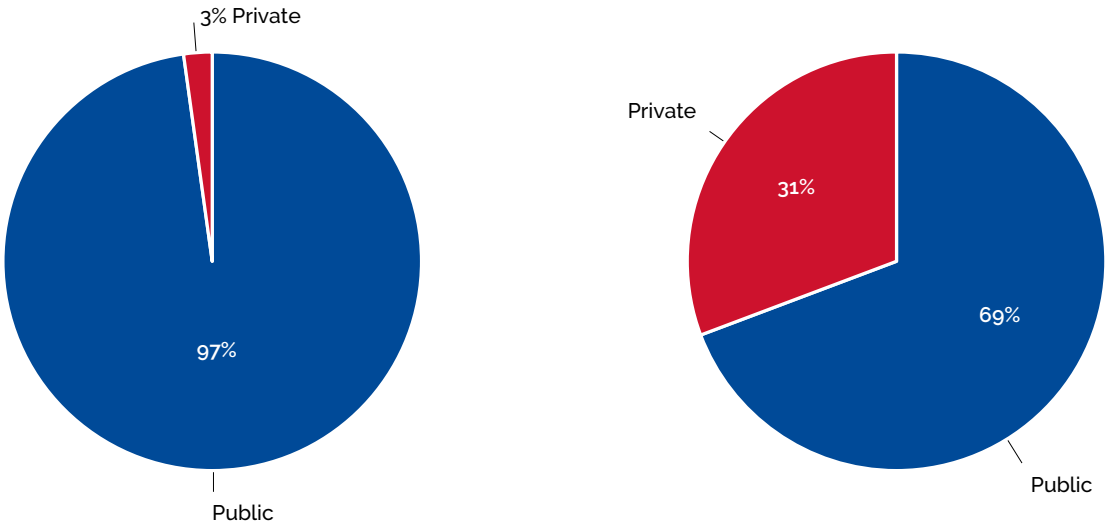
The unit rate in Table 43 is used for damage estimation. As the magnitude of damage varies from section to section of road and in different spots and the damage occurred in a large part of the network, it is difficult to detail the level of damage to each section or spot. The damage is classified into two categories: total damage for road sections with a magnitude of damage higher than 50 percent and partial damage for sections with a magnitude less than 50 percent. The unit rate is differentiated for different classes of road because of their different standards. Based on the lack of homogeneity in the magnitude of damage for each road section and on the knowledge gained from site visits, only 75 percent of the replacement value (construction cost) is used for the total damage category and 40 percent for the partial damage category.

Table 40 — Damage and Losses (billion Lao kip) in the Transport Sector by Ownership

PROVINCE	DAMAGE			LOSSES		
	PUBLIC	PRIVATE	TOTAL EFFECTS	PUBLIC	PRIVATE	TOTAL EFFECTS
Vientiane Capital	25.88	0.00	25.88	0.00	40.99	40.99
Phongsaly	31.10	0.00	31.10	55.78	1.30	57.08
Luangnamtha	33.38	0.00	33.38	8.48	12.50	20.98
Oudomxay	44.28	0.00	44.28	39.88	18.37	58.25
Bokeo	20.63	0.00	20.63	90.03	2.47	92.51
Luangprabang	86.46	0.00	86.46	96.41	22.25	118.66
Huaphanh	176.25	0.00	176.25	49.31	38.58	87.89
Xayaboury	60.31	0.00	60.31	10.52	18.71	29.24
Xiengkhuang	76.77	0.00	76.77	26.03	8.93	34.96
Vientiane	41.50	0.00	41.50	18.18	26.68	44.86
Borikhamxay	29.91	0.00	29.91	3.43	7.67	11.09
Khammuane	53.05	0.00	53.05	4.26	11.11	15.37
Savannakhet	10.82	0.00	10.82	3.90	8.35	12.25
Saravane	4.37	0.00	4.37	2.52	0.29	2.81
Sekong	7.45	0.00	7.45	15.44	2.67	18.12
Champasack	6.01	0.00	6.01	2.19	7.69	9.87
Attapeu	59.52	21.01	80.53	116.41	2.62	119.03
Xaysomboon	33.31	0.00	33.31	0.00	11.83	11.83
TOTAL	**801.01**	**21.01**	**822.02**	**542.77**	**243.03**	**785.80**

Source: Lao PDR Department of Public Works and Transport.

Figure 31 — Damage (left) and Losses (right) in the Transport Sector by Ownership



Source: Lao PDR Department of Public Works and Transport.

Photo Credit: World Bank

Road 18A, Attapeu Bridge destroyed, October 7, 2018.

Table 41 — Length of Damaged Road (kms) by Province

PROVINCE	NATIONAL ROADS	PROVINCIAL ROADS	DISTRICT ROADS	RURAL ROADS	TOTAL OF DAMAGED ROADS
Vientiane Capital	4.40	55.40	138.60	76.90	275.30
Phongsaly	19.00	95.00	45.00	35.00	194.00
Luangnamtha	38.00	244.24	106.88	73.11	462.23
Oudomxay	50.00	72.00	129.00	223.20	474.20
Bokeo	8.00	54.00	9.00	270.00	341.00
Luangprabang	221.00	103.00	230.00	627.00	1,181.00
Huaphanh	390.00	401.00	820.00	816.00	2,427.00
Xayaboury	81.60	265.21	168.29	134.72	649.82
Xiengkhuang	279.74	30.00	711.35	0.00	1,021.09
Vientiane	139.00	171.35	218.00	23.00	551.35
Borikhamxay	51.19	85.00	70.10	184.19	390.48
Khammuane	18.25	151.00	167.33	267.29	603.87
Savannakhet	0.00	78.00	19.00	120.00	217.00
Saravane	0.00	2.00	9.50	53.45	64.95
Sekong	0.00	119.70	34.58	77.60	231.88
Champasack	1.60	48.00	32.80	134.40	216.80
Attapeu	45.00	114.50	42.80	46.20	248.50
Xaysomboon	16.00	65.50	205.20	16.00	302.70
TOTAL	**1,363**	**2,155**	**3,157**	**3,178**	**9,853**

Source: Lao PDR Department of Public Works and Transport.

Losses

Losses to the transport sector are divided into public and private. The losses to the private domain include higher vehicle operating costs, reduced volumes of goods and passengers transported, and interruption to transport services during the floods because of periods when roads were impassable, which affected the revenues of truck and bus operators. The losses to the public domain include the costs of reestablishing practicable traffic conditions during the disaster through emergency maintenance. These include the clearing of landslides, the use of temporary roads and ferries, and the building of temporary bridges. Table 44 shows losses by different types and ownership.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON TRANSPORT

The socioeconomic impact of the damage was felt mostly during the time when roads were cut off, except for districts and villages that remained isolated for several weeks after the storms. Since the disaster, road access to some villages and districts has been difficult. In some districts where the road network was partially damaged, the movement of staple foods and passengers to villages and of local produce out of villages has been significantly reduced and has become more time consuming. For the transport sector, the increased volume of imports of equipment, fuel, and construction materials to replace destroyed infrastructure had an impact on the balance of payments.

RECOVERY STRATEGY AND NEEDS FOR TRANSPORT

The short-, medium-, and long-term needs for recovery of Lao PDR's transport sector from the floods were identified on the basis of losses and focus on resumption of the population's normal activities. They are as follows.

- **Short-term recovery needs (one year):** Include the emergency repair and maintenance of damaged roads and bridges, with priority on critical sections of the road network so traffic flow can be restored to normal conditions and emergency support can reach the affected people.
- **Medium-term recovery needs (six months to two years):** Include periodic maintenance and spot improvements, following MPWT's maintenance procedures. Climate resilience principles should be integrated into the design of maintenance treatment and spot improvement methods.
- **Long-term recovery needs (after two years):** Taking into account the country's limited resources, implementation of climate-resilient road improvements is suggested for selected sections of the damaged roads in the long term. This will include further improvement of vulnerable road sections to climate-resilient design standards so roads and bridges can withstand future floods, with priority on the most critical or vulnerable structures and/or segments of road that are most exposed to recurring floods. Improvements could include additional road slope protection, raised embankments, improved or paved shoulders, improved drainage, and improved pavement structures. Further study and design are required for implementation of these long-term measures. The total needs may be different from those specified in this report, depending on the results of this detailed study and design.
- Several criteria are suggested for prioritizing the needs for all three phases: connectivity, criticality, poverty index, traffic volume, and number of beneficiaries. While the capacity of the provincial DPWTs to manage the reconstruction and local contractors has improved over the last decade to the point where they can manage the maintenance and rehabilitation of the damaged roads, they may need technical assistance to ensure the quality of the work. Financial support from development partners is also crucial to fixing the damage and restoring road connectivity in the affected provinces.
- **Needs in Relation to Risk Reduction:** Preventive measures, among which information and awareness play an important role, are needed to reduce risk in the event of natural disasters. Low quality of road construction and maintenance, inappropriate design, the overloading of trucks, and inadequate budget allocation for road maintenance are also a root cause for severe damage to the road sector during such disasters. Improving the quality of road work, designing roads with sufficient drainage structure, providing sufficient budget for road maintenance, and controlling overloading are all essential to minimizing the impacts of disaster events.
- Other measures may include risk mapping (including hydrological and geotechnical studies) to outline sustainable technical options; preparation of inventories of critical and vulnerable sections of the road network and bridges; improvement of technical standards specification; development of climate-resilient technical guidelines and design manuals; and improvement of climate-resilient road maintenance procedures and oversight mechanisms.

Table 42 — Damaged Road by Road Class and Bridge Types

DESCRIPTION	UNIT	DAMAGE
Road		
National road	km	1,363
Provincial road	km	2,155
District road	km	3,157
Rural road	km	3,178
TOTAL		**9,853**
Bridge		
Bailey bridge/Steel	m	665.80
Concrete bridge	m	250.00
Timber bridge	m	329.15
Other drainage structure	m	197.00
TOTAL		**1,441.95**

Source: Lao PDR Department of Public Works and Transport.

Table 43 — Unit Rate for Damage Estimation (billion Lao kip/km)

DESCRIPTION	UNIT RATE FOR COST ESTIMATION		
	CONSTRUCTION	DAMAGE <50%	DAMAGE >50%
National road			
Concrete	3.00	1.20	2.25
Asphalt	2.50	1.00	1.88
DBST/SBST	0.88	0.35	0.66
Gravel Road	0.31	0.12	0.23
Earth Road	0.12	0.05	0.09
Provincial road			
Concrete	2.40	0.96	1.80
Asphalt	2.00	0.80	1.50
DBST/SBST	0.70	0.28	0.52
Gravel road	0.25	0.10	0.18
Earth road	0.10	0.04	0.07
District road			
Concrete	1.80	0.72	1.35
Asphalt	1.50	0.60	1.13
DBST/SBST	0.53	0.21	0.39
Gravel road	0.18	0.07	0.14
Earth road	0.07	0.03	0.05
Rural road			
Concrete	1.50	0.60	1.13
Asphalt	1.25	0.50	0.94
DBST/SBST	0.44	0.18	0.33
Gravel road	0.15	0.06	0.12
Earth road	0.06	0.02	0.04
Bridge			
Bailey/steel bridge	0.13	0.05	0.10
Concrete bridge	0.22	0.09	0.16
Timber	0.02	0.01	0.01
Others	0.05	0.02	0.03

Source: Lao PDR Department of Public Works and Transport.

Note: DBST = double bituminous surface treatment; SBST = single bituminous surface treatment.

Table 44 — Losses in the Transport Sector (billion Lao kip) by Different Types and Ownership

LOSSES	PRIVATE	PUBLIC	TOTAL
Reduced revenue	17.27	--	17.27
Higher operational cost	225.75	--	225.75
Clearing of landslides and mud, temporary bridges, ferries	--	542.77	542.77
TOTAL	**243.03**	**542.77**	**785.80**

Source: Lao PDR Department of Public Works and Transport.

Table 45 — Recovery and Reconstruction Needs (billion Lao kip) in the Transport Sector by Province

PROVINCE	SHORT-TERM	MEDIUM-TERM	LONG-TERM	TOTAL
Vientiane Capital	14.63	33.48	0.00	48.11
Phongsaly	23.55	42.39	80.58	146.52
Luangnamtha	62.03	37.22	90.12	189.37
Oudomxay	90.61	58.20	111.33	260.13
Bokeo	14.11	65.12	53.18	132.41
Luangprabang	28.83	88.66	80.04	197.53
Huaphanh	60.21	0.00	0.04	60.25
Xayaboury	19.73	19.06	9.53	48.32
Xiengkhuang	15.62	53.77	0.00	69.39
Vientiane Province	19.57	60.95	120.05	200.57
Borikhamxay	63.29	14.52	0.00	77.81
Khammuane	35.94	35.80	0.00	71.74
Savannakhet	46.60	24.45	25.90	96.96
Saravane	8.65	10.68	3.21	22.54
Sekong	17.74	24.84	39.34	81.92
Champasack	41.66	54.16	61.87	157.70
Attapeu	4.46	35.26	158.75	198.47
Xaysomboon	14.90	0.00	0.00	14.90
TOTAL	**582.15**	**658.57**	**833.93**	**2,074.65**

TRANSPORT METHODOLOGY

This assessment of transport infrastructure was carried out based on data provided by the Department of Public Works and Transport (DPWT) in each province, which were then verified by the post-disaster needs assessment (PDNA) team through site visits to damaged roads. The estimated need has been revised downward from the estimates proposed by provincial governments for two reasons: first, some of the proposed repair work should be classified as part of regular maintenance activities, and, second, the assessment team observed during its field visits that the needs had been overestimated. The typology of damage was reconfirmed after the assessment through surveys conducted by the DPWTs that differentiated and classified various types of damage, such as full and partial, and adjusted needs accordingly where required.

Landslide along 1C Road, Ngoy District, Luangprabang Province, September 29, 2018.

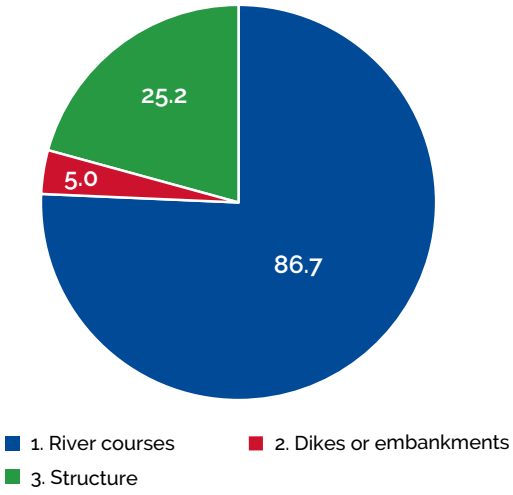
Photo Credit: World Bank

WATERWAYS

WATERWAYS SUMMARY

The floods caused damage to waterways infrastructure and facilities related to flood protection and navigation along the Mekong, Nam Khan, and Nam Nguem rivers, primarily concentrated in the provinces of Vientiane Capital, Luangprabang, Xayaboury, and Khammuane.[59] Most of the damage was to river course slope protection infrastructure, dikes, embankments, floodgates, ports, and navigation aids.[60] The overall damage caused by the disaster is estimated at 116.9 billion Lao kip. Several short-, medium-, and long-term activities are proposed over a five-year time frame to address recovery needs. They include (1) technical assistance with engineering survey and design; (2) a program to rehabilitate and improve damaged waterways infrastructure systems and facilities; (3) development of national technical standards and norms for flood protection in waterways infrastructure planning, design, construction, and management; and (4) further development of proper flood monitoring and warning mechanisms. The total estimated funding requirements for the recovery and reconstruction interventions is 250 billion Lao kip.

Figure 32 — Distribution of Damage (billion Lao kip) by Infrastructure



WATERWAYS BACKGROUND

Waterways in Lao PDR consist of rivers within and outside the Mekong River Basin. The Mekong River is the longest and widest navigable river in the country, flowing from north to south for 1,865 km. About 90 percent of the country's territory is located in the Mekong Basin. The Department of Waterways (DOW) under the Ministry of Public Works and Transport (MPWT) is responsible for management of inland waterways in the country, including policy, planning, development, and management of infrastructure and facilities for ports, navigation channels, flood control, riverbank protection, and waterway transport.

MPWT's line offices at the provincial and district levels are responsible for waterway-related works within their respective provinces and districts. As of 2018, major waterway infrastructure systems and facilities established and developed in the country include 21 small-scale river port facilities; 15 km of river dredging in city areas; 135.7 km of river embankments and slope protection infrastructure; and 52.4 km of dikes, of which 49.2 km is located in the Mekong mainstream and 3.2 km in its tributaries. An additional 20.8 km of slope protection work is currently being implemented.

In 2015, MPWT, with assistance from the Government of Korea, developed a Master Plan (MP) for Integrated Flood Management. The MP has three main objectives:

1. Promote integrated waterway management along the Mekong River to protect local human lives, property, and land resources of local residents from flood inundation and bank erosion.

59. Damage and losses to water infrastructure related to hydropower, water supply, irrigation systems, and transport is covered in separate chapters.

60. Embankment refers to a constructed or enhanced riverbank section. Dike refers to a flood protection wall built on the top of an embankment or a natural riverbank. River course slope protection refers to erosion protection works built on the water-facing slope of an embankment or a natural riverbank.

Table 46 — Damage to Waterways (billion Lao kip) by Province

PROVINCE	WATERWAY INFRASTRUCTURE/FACILITIES DAMAGED	LENGTH/ NUMBER AFFECTED	DAMAGE (BILLION LAO KIP)		
			PRIVATE	PUBLIC	TOTAL
Vientiane Capital	River courses	3,000 m	--	75.0	75.0
	Dikes or embankments	4,400 m	--	5.0	5.0
	Structures	29	--	22.8	22.8
	Floodgates	22	--	22.2	22.2
	Ports and navigation aids	7	--	0.6	0.6
	Provincial total	--	--	102.8	102.8
Luangprabang	River courses	200 m	--	8.0	8.0
	Dikes or embankments	--	--	--	--
	Structures	--	--	--	--
	Floodgates	--	--	--	--
	Ports and navigation aids	--	--	--	--
	Provincial total	--	--	8.0	8.0
Xayaboury	River courses	--	--	--	--
	Dikes or embankments	--	--	--	--
	Structures	1	--	2.4	2.4
	Floodgates	--	--	--	--
	Ports and navigation aids	1	--	2.4	2.4
	Provincial total	--	--	2.4	2.4
Khammuane	River courses	100 m	--	3.7	3.7
	Dikes or embankments	--	--	--	--
	Structures	--	--	--	--
	Floodgates	--	--	--	--
	Ports and navigation aids	--	--	--	--
	Provincial total	--	--	3.7	3.7
SUMMARY	River courses	3,300 m	--	86.7	86.7
	Dikes or embankments	4,400 m	--	5.0	5.0
	Structures	30	--	25.2	25.2
	Floodgates	22	--	22.2	22.2
	PORTS AND NAVIGATION AIDS	**8**	**--**	**3.0**	**3.0**
	NATIONAL TOTAL	**--**	**--**	**116.9**	**116.9**

Source: Based on data from the Department of Waterways, Ministry of Public Works and Transport.

2. Prepare investment projects by conducting prefeasibility and feasibility studies at prioritized sites.

3. Provide a basis for planning and implementing effective and systematic measures for river management by the Government of Lao PDR.

The MP covers the whole Mekong mainstream in Lao PDR and eight major tributaries, including Nam Khan in Luangprabang Province, Nam Houng and Nam Heaung in Xayaboury Province, Nam Ngum in Vientiane Capital, Nam Xan in Borikhamxay Province, Xebangfai in Khammuane Province, Xedon in Saravane Province, and Xekong in Attapeu Province.

Waterway infrastructure systems are still limited in Lao PDR. Strategic planning, design, construction, and management of waterway infrastructure are lacking, flood control measures are insufficient, and early warning and public alert systems are rudimentary. Moreover, the projected effects of climate change, especially more frequent and intensified floods, have yet to be mainstreamed into the sector's development planning. These systemic issues increase Lao PDR's vulnerability to flood risk, especially in the plain and lower Mekong regions.

ASSESSMENT OF DISASTER EFFECTS ON WATERWAYS

Damage

Based on the reports submitted by the provincial governments, the floods caused the erosion and collapse of river course slope protection infrastructure, dikes, and embankments along the Mekong River and Nam Khan and Nam Nguem tributaries. In total, 3,000 meters of river course slope protection, 4,400 meters of dikes and embankments, 22 floodgates, and eight ports and navigation aids were damaged, with the damage estimated at 116.9 billion Lao kip. The damage estimates are summarized in Table 46 and described below.

Vientiane Capital

- **Mekong mainstream:** Slope protection damaged in four locations, with a total length of 3,000 meters; one dike damaged, with a total length of 4,400 meters; and 18 floodgates and five ports and navigation aids damaged. Total estimated damage is 101.9 billion Lao kip.
- **Nam Nguem River:** Four floodgates and two ports and navigation aids damaged. Total estimated damage is 0.9 billion Lao kip.

Luangprabang

- **Nam Khan River:** One slope protection damaged, with a total length of 200 meters. Total estimated damage is 8 billion Lao kip.

Xayaboury

- Mekong mainstream: One port and navigation aid damaged. Total estimated damage is 2.4 billion Lao kip.

Khammuane

- Mekong mainstream: One slope protection damaged, with a total length of 100 meters. Total estimated damage is 3.7 billion Lao kip.

Losses

Direct losses did not occur. Temporary repairs were not undertaken, and DOW did not experience higher than normal operational costs or other changes to economic flows.

Damage to slope protection of Mekong mainstream, Thakek District, Khammuane Province.

Damage to slope protection of Nam Kham River, Kili Village, Luangprabang Province.

Photo Credit: World Bank.

Table 47 — Recovery Needs for Post-Disaster Recovery of Waterways

PROVINCE	RECOVERY NEEDS AND PROPOSED ACTIVITIES	COST (BILLION LAO KIP)
Vientiane Capital	River courses	92.5
	Dikes or embankments	6.0
	Structures	27.4
	Floodgates	26.6
	Ports and navigation aids	0.7
	Provincial total	125.9
Luangprabang	River courses	18.6
	Dikes or embankments	6.0
	Structures	--
	Floodgates	--
	Ports and navigation aids	--
	Provincial total	24.6
Xayaboury	River courses	18.7
	Dikes or embankments	--
	Structures	2.9
	Floodgates	--
	Ports and navigation aids	2.9
	Provincial total	21.6
Khammuane	River courses	38.4
	Dikes or embankments	--
	Structures	--
	Floodgates	--
	Ports and navigation aids	--
	Provincial total	38.4
MPWT	Engineering survey and design	13.5
	Sector capacity development on DRM	26.0
	Total for MPWT	39.5
SUMMARY	River courses	168.2
	Dikes or embankments	12.0
	Structures	30.3
	Floodgates	26.6
	Ports and navigation aids	3.6
	Engineering survey and design	13.5
	Sector capacity development on DRM	26.0
	NATIONAL TOTAL	**250.0**

Note: DRM = Disaster Risk Management; MPWT = Ministry of Public Works and Transport.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON WATERWAYS

Waterway infrastructure is meant to safeguard citizens and communities, protect economic activities, and enable navigation. As communication links and infrastructure such as electricity lines, roads, and bridges are damaged and disrupted, some economic activities may come to a standstill, local citizens may be forced to leave their homes, and livelihoods may be disrupted.

The damage to infrastructure as a result of the floods in Lao affected human lives, assets, and productive activities and, hence, all aspects of society and economy in the areas it where it occurred. The damage to slope protection of the Mekong mainstream in the Thakek District, Khammuane Province, for instance, affected associated roads, drainage channels, and trees, while the damage to slope protection of the Nam Khan River in Kivi Village, Luangprabang Province, affected roads, drainage channels, and electricity lines.

RECOVERY STRATEGY AND NEEDS FOR WATERWAYS

The following strategies and principles were set to operationalize post-disaster recovery and reconstruction in the waterways sector:

- **Build back better:** The principle behind this effort aims to rehabilitate the damaged waterway infrastructure and systems and upgrade them to up-to-date technical standards and specifications.
- **Comprehensive and phased approach:** Recovery and reconstruction efforts will take into consideration needs for technical assistance, engineering construction, and sector capacity development and categorize them into short-, medium-, and long-term activities. A phased approach will ensure key infrastructure systems recover in a timely manner to safeguard the implementation of recovery activities in other sectors and prioritize big cities and areas inhabited by impoverished and vulnerable groups.
- **Participatory approach aligned with development planning:** Recovery activities will be proposed and prioritized through a participatory approach, in close consultation with relevant stakeholders and in line with relevant government policy and development plans.
- **Efficiency and sustainability:** A cost-benefit analysis and feasibility study will be conducted for each recovery activity to ensure investment efficiency and sustainability.

Table 47 reflects the recovery needs and activities for the waterways sector. The total funding requirement for these interventions is an estimated 250 billion Lao kip over five years (2019–23), of which 84.2 billion Lao kip is to be funded by the government and 165.8 billion Lao kip financed through international assistance. Several short-, medium-, and long-term activities are proposed for this five-year time frame to address the recovery needs:

- Technical assistance with engineering design survey and design
- A program to rehabilitate and improve damaged waterway infrastructure systems and facilities
- Development of national technical standards and norms for flood protection in waterway infrastructure planning, design, construction, and management
- Further development of proper flood monitoring and warning mechanisms
- Provision of relevant training, including post-disaster needs assessment (PDNA) methods and procedures

Table 48 reflects a prioritization of interventions proposed for implementation in the short, medium, and long terms. The 12 proposed activities include six projects to be implemented and completed in 2019, at a total cost of 32 billion Lao kip; three projects to be completed by 2020, at a cost of 63.6 billion Lao kip; and three projects to be finalized by 2023, at a cost of 154.4 billion Lao kip. Engineering survey and design activities will be conducted during the initial stages of the recovery work.

All construction work is envisaged to be completed in three years to enable and secure the implementation of recovery activities in other sectors in their respective areas. Sector capacity development activities will be implemented throughout the five-year recovery period. MPWT, in cooperation with its line offices in provinces and districts, will be responsible for planning and implementing these interventions.

WATERWAYS METHODOLOGY

Sector-specific templates and procedures were developed for the waterways sector in coordination with DOW of MPWT and circulated to each of the provinces. Data and information analyzed and presented in this report are based on submissions from the provincial offices and were validated by DOW. While a few small-scale systems are private, most waterway infrastructure and facilities in Lao PDR are public. This PDNA only covers public systems.

Table 48 — Recovery and Reconstruction Needs (billion Lao kip) in the Waterways Sector

PRIORITIZED PROJECTS/ ACTIVITIES	COST	FINANCING SOURCES		ANNUAL EXPENDITURE				
		GOV.	DONOR	Y1	Y2	Y3	Y4	Y5
Short-term recovery needs								
Engineering survey and design for post-disaster recovery projects	13.5	0	13.5	13.5	--	--	--	--
Luangprabang Nam Khan River dike construction (1,000 m)	6.0	2.4	3.60	6	--	--	--	--
Xayaboury Mekong mainstream structure recovery (one port)	2.9	1.2	1.70	2.9	--	--	--	--
Vientiane Capital Mekong mainstream embankment recovery (4,400 m)	6.0	2.4	3.60	6	--	--	--	--
Vientiane Capital Nam Nguem River slope protection (125 m)	2.5	1.0	1.50	2.5	--	--	--	--
Vientiane Capital Nam Nguem River structure recovery (four floodgates and two ports)	1.1	0.4	0.7	1.1	--	--	--	--
SUBTOTAL	**32.0**	**7.4**	**24.6**	**32.0**	**--**	**--**	**--**	**--**
Medium-term recovery needs								
Luangprabang Nam Khan River bank erosion recovery (200 m) and slope protection (1,000 m)	18.6	7.4	11.2	9.6	9	--	--	--
Vientiane Capital Mekong mainstream structure recovery (eighteen floodgates and five ports)	26.3	10.5	15.8	10.0	16.3	--	--	--
Xayaboury Mekong mainstream slope protection (850 m)	18.7	7.5	11.2	7.5	11.2	--	--	--
SUBTOTAL	**63.6**	**25.4**	**38.2**	**27.1**	**36.5**	**--**	**--**	**--**
Long-term recovery needs								
Vientiane Capital Mekong mainstream slope protection recovery (3,000 m)	90.0	36.0	54.0	30.0	30	30	--	--
Khammuane Mekong mainstream bank erosion recovery (100 m) and slope protection (1,000 m)	38.4	15.4	23.0	10.0	14.4	14	--	--
Sector capacity development on DRM (technical norms, monitoring and responding, and PDNA)	26.0	--	26.0	6.0	5	5	5	5
SUBTOTAL	**154.4**	**51.4**	**103.0**	**46.0**	**49**	**49**	**5**	**5**
TOTAL	**250.0**	**84.2**	**165.8**	**105.1**	**85.9**	**49.0**	**5.0**	**5.0**

Note: DRM = Disaster Risk Management; PDNA = Post-Disaster Needs Assessment

WATER SUPPLY AND SANITATION

WATER SUPPLY AND SANITATION SUMMARY

The floods heavily affected urban and rural water supply, sanitation, and hygiene (WASH) facilities. The post-disaster needs assessment (PDNA) estimated the total damage and losses to the sector at 69.9 billion Lao kip (see Figure 33). Funding requirements to meet short-, medium-, and long-term recovery needs are estimated at 68.2 billion Lao kip.

In the urban water supply sub-sector, 31 urban water supply systems across 12 provinces incurred physical damage amounting to 7.1 billion Lao kip and losses of 7.7 billion Lao kip, for a total of 14.8 billion Lao kip, affecting 289,774 people in 54,600 households. The estimated short-term recovery needs are 6.3 billion Lao kip to restore access to water supply to affected households and carry out the required emergency repairs to bring back normal services. Medium- and long-term needs, at an estimated at 6.2 billion Lao kip, include completion of the rehabilitation of damaged facilities and the building of resilient water supply systems, as well as capacity-building activities.

In the rural water supply and sanitation sub-sector, the affected WASH facilities include 223 rural gravity-fed systems (GFSs), 7,700 boreholes, and 6,646 dug wells. In addition, 28,114 latrines were damaged or destroyed, and WASH facilities in 195 schools and nine health centers also incurred damage. Damage and losses for rural water supply and sanitation are estimated at 55.2 billion Lao kip. The flooding has resulted in a significant need for rehabilitation of damaged facilities in all affected provinces, with construction of new facilities required in Huaphanh and Attapeu. The total amount needed for short-, medium-, and long-term recovery and reconstruction is estimated at 55.8 billion Lao kip.

WATER SUPPLY AND SANITATION BACKGROUND

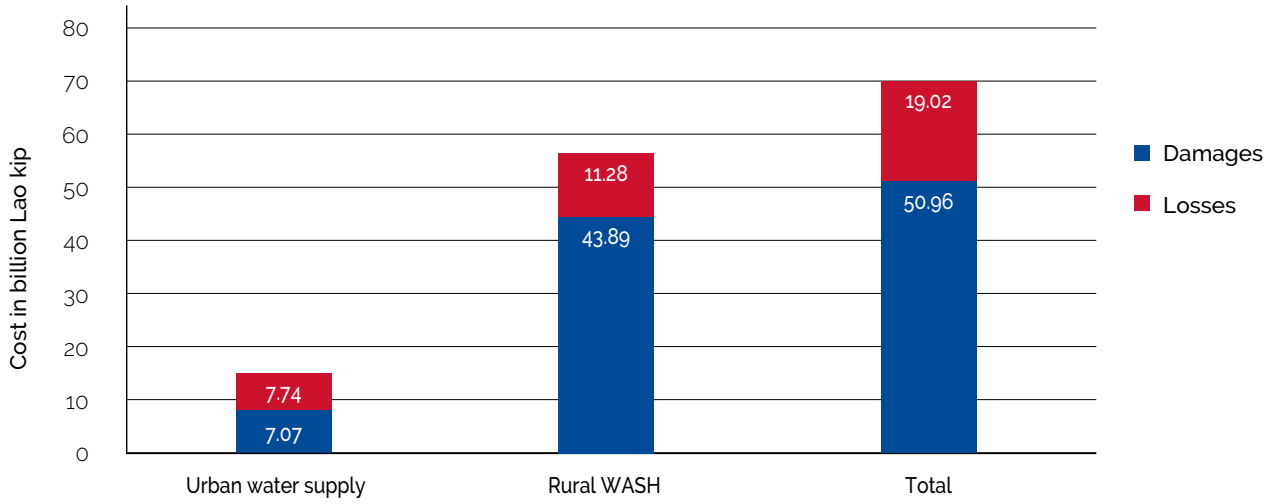
Urban water supply: Urban water systems in Lao PDR are managed by the Provincial Nam Papa State Enterprises (PNPSEs), which are responsible for water supply services in peri-urban and urban areas across the country. The PNPSEs have district-level branches called district Nam Papas. Although they are financially autonomous and operate on a commercial basis, PNPSEs administratively report to a Provincial Department of Public Works and Transport (PDPWT). Similarly, besides administratively reporting to the PNPSEs, the district Nam Papa branches also report to the District Public Works and Transport Office. In 2017, water supply coverage extended to 71.9 percent of urban populations. Of 148 urban areas, 93 are being served by metered water supply. Based on the 2017 Lao Social Indicator Survey II, 80 percent of the population nationally has access to improved water sources, and 71 percent have access to improved sanitation.[61]

Rural water supply and sanitation: In the mountainous northern regions of Lao PDR, the most common means of providing an improved water supply is a gravity-fed system (GFS). In lower elevations, especially in the south, shallow groundwater sources are made available through boreholes with hand pumps and protected dug wells. These sources constitute the great majority of improved water supplies available in rural areas. According to the Lao Social Indicator Survey II 2017, access to basic sources of water reached 80 percent (76 percent in rural settings, compared to 90 percent in urban). National sanitation coverage reached 71 percent (61 percent in rural settings, compared to 92 percent in urban).[62]

61. Government of Lao PDR, Lao Statistics Bureau, Lao Social Indicator Survey II, 2017.

62. Ibid.

Figure 33 — Damage and Losses (billion Lao kip) in the Water Sector



The service delivery model for WASH in rural areas is based on community-managed water supplies. The communities also contribute to the construction of community water supplies (for example, GFSs) by providing labor and/or local construction materials (timber, sand, and gravel). For sanitation, the increase in coverage is mainly the result of private (household) investment. The demand for sanitation is created through a community-led total sanitation (CLTS) approach. Households have the ability to choose among different technology options, depending on their affordability.

ASSESSMENT OF DISASTER EFFECTS ON WATER SUPPLY AND SANITATION

Damage

Urban water supply: Across 31 affected district Nam Papas in 12 PNPSEs, two-thirds of the damaged components of the water supply systems seem to be associated with water intake facilities (raw water pipelines and water pumps) and main distribution lines. The assessment of physical damage amounts to 7.1 billion Lao kip, with most incurred by the NPSEs of Oudomxay, Huaphanh, and Xayaboury provinces. Six PNPSEs confirmed that their urban water supply systems were not affected by the flooding: Vientiane Capital, Phongsaly, Bokeo, Vientiane Province, Borikhamxay, and Khammuane.

Rural water supply and sanitation: A total of 291,115 people, 46,582 households, and 954 villages were affected by the flooding. Two provinces in particular suffered in terms of facilities that were damaged or, especially, destroyed. In Attapeu, 133 public boreholes with hand pumps were totally destroyed or submerged in mud, while 45 were damaged. As for private boreholes with electric pumps, 246 were destroyed and 30 damaged. For sanitation, 1,753 household latrines were destroyed, and 782 were damaged. In Huaphanh, three GFSs in two districts were totally destroyed.

In other provinces throughout the country, damage was reported in many districts, ranging from 10 to 50 percent of facilities affected. During and after flooding, shortages of safe water resulted from damage and contamination of water points. Communities in the affected districts are in need of clean water supply, as water quality remains an issue. The use of surface water is a concern, and open defecation is also reported, as many sanitation facilities were destroyed or damaged.

Losses

Urban water supply: Losses to urban water supply relate mainly to emergency repairs of damaged components, labor costs for cleaning and maintenance, and revenue loss from reduced distribution of water supply services. On average, the water supply service was distributed over a period of two weeks in 31 affected district Nam Papa branches. Losses were estimated at a total of 7.7 billion Lao kip, incurred mainly as temporary repair work was underway to restore water supply services.

Table 49 — Damage and Losses (billion Lao kip) in Water and Sanitation

SUB-SECTOR	DAMAGE			LOSSES		
	PUBLIC	PRIVATE	TOTAL EFFECTS	PUBLIC	PRIVATE	TOTAL EFFECTS
Urban water: 12 PNPSEs	6.597	0.477	7.074	7.671	0.071	7.739
Rural water and sanitation	18.39	25.54	43.89	3.72	7.56	11.28
TOTAL	**24.98**	**26.01**	**50.96**	**11.39**	**7.63**	**19.02**

Source: Deaprtment of Water and Sanitation, October 2018.

Table 50 — Damage and Losses (billion Lao kip) by Province

URBAN WATER SUPPLY AND SANITATION							
PROVINCE	DAMAGE			LOSSES			TOTAL EFFECTS
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL	
Vientiane Capital	0	0	0	0	0	0	0
Phongsaly	0	0	0	0	0	0	0
Luangnamtha	0.722	0	0.722	0.778	0	0.778	1.500
Oudomxay	1.980	0	1.980	2.294	0	2.294	4.274
Bokeo	0	0	0	0	0	0	0
Luangprabang	0.208	0.477	0.685	0.279	0	0.279	0.964
Huaphanh	1.213	0	1.213	1.278	0	1.278	2.491
Xayaboury	0.956	0	0.956	1.141	0.071	1.212	2.168
Xiengkhuang	0.025	0	0.25	0.028	0	0.028	0.053
Vientiane Province	0	0	0	0	0	0	0
Borikhamxay	0	0	0	0	0	0	0
Khammuane	0	0	0	0	0	0	0
Savannakhet	0.288	0	0.288	0.316	0	0.316	0.604
Saravane	0.268	0	0.268	0.289	0	0.289	0.557
Sekong	0.521	0	0.521	0.597	0	0.594	1.115
Champasack	0.175	0	0.175	0.268	0	0.268	0.443
Attapeu	0.108	0	0.108	0.238	0	0.238	0.346
Xaysomboon	0.133	0.000	0.133	0.165	0	0.165	0.298
SUBTOTAL	**6.597**	**0.477**	**7.074**	**7.671**	**0.071**	**7.739**	**14.813**

RURAL WATER SUPPLY AND SANITATION							
PROVINCE	DAMAGE			LOSSES			TOTAL EFFECTS
	PUBLIC	PRIVATE	TOTAL EFFECTS	PUBLIC	PRIVATE	TOTAL EFFECTS	TOTAL
Vientiane Capital	2.76	5.52	8.26	0.88	1.76	2.64	10.9
Phongsaly	0.23	0	0.23	0	0.02	0.02	0.25
Luangnamtha	0	0	0	0	0	0	0
Oudomxay	0.32	0	0.32	0	0.02	0.02	0.34
Bokeo	0.38	0	0.38	0	0.02	0.02	0.4
Luangprabang	0.06	0	0.06	0	0	0.0	0.06
Huaphanh	2.99	0	2.99	0.08	0.16	0.24	3.23
Xayaboury	0.03	0	0.03	0	0	0	0.03
Xiengkhuang	1.61	0	1.61	0.05	0.12	0.17	1.78
Vientiane Province	0.68	1.36	2.03	0.19	0.39	0.58	2.61
Borikhamxay	1.47	2.94	4.40	0.44	0.89	1.33	5.73
Khammuane	2.91	5.82	8.73	0.58	1.18	1.76	10.49
Savannakhet	2.52	5.04	7.56	0.88	1.76	2.64	10.2
Saravane	0	0	0	0	0	0	0
Sekong	0	0	0	0	0	0	0
Champasack	1.59	3.18	4.77	0.49	0.99	1.48	6.25
Attapeu	0.84	1.68	2.52	0.13	0.27	0.40	2.92
Xaysomboon	0	0	0	0	0	0	0
SUBTOTAL	**18.39**	**25.54**	**43.89**	**3.72**	**7.56**	**11.28**	**55.19**

Source: PDNA field assessment and data collected by Department of Water and Sanitation, October 2018, and Ministry of Health, October 2018.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON WATER SUPPLY AND SANITATION

Urban water supply: The effects of the floods on the distribution of water supply services predominantly affected women and children, as they are mainly responsible for fetching water for household use and consumption. Limited water supply services generally affect personal hygiene, as people are not able to wash regularly.

Rural water supply and sanitation: As a result of flooding, drinking water was either unavailable or contaminated, which became a burden for households having to buy bottled water for drinking. The assessment estimated that about 6 billion Lao kip was spent on bottled water. In some parts of the country, the sanitation facilities were destroyed by the floods. Poor sanitation and hygiene are already significant causes of the spread of disease in Lao PDR. Outbreaks of waterborne diseases among vulnerable people in the affected provinces are a concern.

Photo credit: Assessment team.

Gravity-fed water supply system damaged by flood in Xiengkhuang Province.

Photo credit: DPWT of Oudomxay Province and World Bank.

Nam Papa team of Beng District, Oudomxay Province, carries out emergency repairs to damaged urban water supply systems.

Damage on mainline distribution network of Nam Papa in Ngoy District, Luangprabang Province.

Photo credit: DPWT of Luangprabang and World Bank.

RECOVERY STRATEGY AND NEEDS FOR WATER SUPPLY AND SANITATION

Urban water supply: Urban systems have been temporarily repaired in the most affected areas, and water supply services have been restored to the majority of affected households. Rehabilitation and replacement of damaged components is still required urgently to prevent further damage.

- For short-term needs, the focus needed to be on restoring the access of affected households to water supply services through alternative water sources and by carrying out the required emergency repairs to bring back normal services. While the assessment was taking place, these steps were already implemented, and temporary repair work was completed.
- Medium-term recovery should emphasize the rehabilitation and replacement of damaged components that were not replaced during temporary emergency repair work. The funding needed for medium-term recovery is estimated at 4.5 billion Lao kip.
- Both medium-term and long-term recovery will involve building capacity for the design and implementation of resilience measures in the water sector and developing Disaster Risk Management (DRM) strategies at the provincial level, including training of PNPSEs in their role of facilitating service delivery and planning for flood-affected areas.

Rural water supply and sanitation: The total monetary value of rural recovery needs amounts to an estimated 55.8 billion Lao kip. The short-term recovery builds on ongoing emergency response, which focuses on rehabilitation and repair of water supply systems, including family latrines.

WATER SUPPLY AND SANITATION METHODOLOGY

Urban water supply: Data collection was carried out by the Department of Water Supply of the Ministry of Public Works and Transport (MPWT) through the Provincial Department of Public Works and Transport (PDWT) and PNPSE of each of Lao PDR's 18 provinces. Data on damage and losses were reported by each district Nam Papa branch to its PNPSE, based on its evaluation of damaged components, its temporary repair costs, and its estimate for permanent replacement costs. Several heavy flash floods took a toll on already affected Nam Papa systems, as temporary repair work had to be carried out more than once on the same and newly damaged components of the water supply systems. A field data validation was conducted in Beng District, Oudomxay Province, and Ngoy District, Luangprabang Province, by the World Bank's Water and Sanitation Specialist. The selection of these two districts was based on the magnitude of damage and the accessibility to observe the water supply installations. The assessment provided an indication of the impact of and needs arising from the disaster to the water supply system.

Rural water supply and sanitation: Data were collected from affected provinces through their respective health departments. Six provinces (Huaphanh, Xiengkhuang, Khammuane, Savannakhet, Champasack, and Attapeu) were identified for field verification based on the severity of damage. The WASH components of the assessment were led by the Ministry of Health (MOH) and UNICEF. The assessment provided an overview of the impacts of and needs arising from the disaster. The facilities were categorized into public (one-third) and private (two-thirds) and the losses calculated based on the assessment and secondary data from MOH. Losses included the cost of labor and materials needed to repair and clean WASH facilities after the floods and restore the structures to their original condition. The calculations were based on 2 million Lao kip per gravity-fed system, 500,000 Lao kip per borehole or dug well, and 100,000 Lao kip per family latrine.

Recovery and reconstruction costs represent the total value of damage, losses, and supervision and administration. Out of the eighteen provinces, data from four (Luangnamtha, Saravane, Sekong, and Xaysomboon) were not available. This could be due to underreporting or to these provinces having been less affected.

Table 51 — Recovery and Reconstruction Needs (billion Lao kip) in the Water and Sanitation Sector

SHORT-TERM RECOVERY NEEDS (ONE YEAR)			
SUB-SECTOR	**PROGRAM OF ACTIVITY**	**VALUE (BILLION LAO KIP)**	**RESPONSIBLE AGENCIES**
Urban water supply	Replacement of damaged components not replaced during temporary repair work	6.308	PNPSEs and Provincial Departments of Public Works and Transport Offices (PDWTs)
Rural WASH	Water points disinfection, including the procurement of field test kits for water sample testing and WASH emergency pre-positioning (chlorine tablets, chlorine powder, soap, buckets, and jerry cans)	1.50	Provincial/district Nam Saat under Ministry of Health and UNICEF, WHO, and WASH partners
	Rehabilitation/repair of water supply systems, including survey and design, and family latrines, including hygiene promotion (behavior change)	23.1	Provincial/district Nam Saat under Ministry of Health and UNICEF and WASH partners
	Capacity building to enhance community resilience for DRM		
SUBTOTAL SHORT-TERM		**30.91**	
MEDIUM-TERM RECOVERY NEEDS (TWO YEARS)			
Urban water supply	Reconstruction or replacement of damaged components, with capacity building on design and implementation of resilience measures	4.648	PNPSEs and Provincial Public Work and Transport Offices (PPWTOs)
Rural WASH	Rehabilitation/repair of water supply systems and family latrines, including hygiene promotion (behavior change)	15.0	Provincial/district Nam Saat under Ministry of Health and UNICEF and WASH partners
SUBTOTAL MEDIUM-TERM		**19.65**	
LONG-TERM RECOVERY NEEDS (TWO TO FIVE YEARS)			
Urban water supply	Reconstruction or replacement of damaged components, with capacity building on design and implementation of resilience measures	1.563	PNPSEs and Provincial Public Work and Transport Office (PWTO)
Rural WASH	Rehabilitation/repair of water supply systems and family latrines, including hygiene promotion (behavior change)	14.7	Provincial/district Nam Saat under Ministry of Health and UNICEF and WASH partners
	Capacity building on community resilience with regard to DRM (including such training for flood-prone villages, as well as refresher training for provincial and district authorities)	1.7	Provincial/district Nam Saat under Ministry of Health and UNICEF and WASH partners
SUBTOTAL LONG-TERM		**17.96**	
TOTAL NEEDS		**68.52**	

Note: DRM = Disaster Risk Management; PNPSE = Provincial Nam Papa State-Owned Enterprises; UNICEF = United Nations Children's Fund; WASH = Water Supply, Sanitation, and Hygiene; WHO = World Health Organization

ELECTRICITY

ELECTRICITY SUMMARY

The floods caused moderate damage to the electricity sector in all of the country's provinces. The total effects of the floods are estimated at 45.3 billion Lao kip, consisting of 42.2 billion Lao kip in damage to the transmission and distribution infrastructure and 3.1 billion Lao kip in losses. Damage and losses in the distribution sub-sector were mainly caused by faults and collapsed poles in distribution lines, while damage in the transmission and substation sub-sectors was mainly caused by landslides. Notably, no interruption of electricity supply resulted from the damage to the transmission and substation infrastructure, and no damage was reported for the power generation infrastructure. Almost all electricity facilities and equipment are planned to be repaired and put back into operation in the short term (within one year of the disaster). A medium-term priority should be the reconstruction of transmission towers, including the restringing of conductors, if necessary.

ELECTRICITY BACKGROUND

Over the past 20 years, one of the main pillars of Lao PDR's economic and social development has been its energy strategy, which has focused on hydropower development, a national electrification program, and the export of electricity. The power sector has expanded robustly as the country has exploited its ample hydro potential and, most recently, thermal and other sources of energy, with Installed capacity (from all energy sources) estimated at around 6,800 MW in 2017 and potentially reaching 11,000 MW by 2021.[63] The sector has boosted growth and poverty reduction through investments, provision of reliable, clean, and affordable energy, and higher exports. It has, however, also contributed to the current large national budget deficit, although the deficit has partially been paid off as electricity has become one of the top export earners.

An impressive electrification effort supported by the expansion of the power sector has also improved livelihoods and supported businesses in Lao PDR. By the end of 2016, around 92 percent of households were electrified (reaching 94 percent by mid-2017), which was up from 78.5 percent in 2011 and only 15 percent in 1995.[64]

Despite this progress, underdeveloped and inefficient transmission and distribution networks and seasonality of domestic hydropower have left the domestic power market prone to low reliability of power supply and pressures to import electricity in certain areas, even as the country has developed significant export capacity. While around two-thirds of the installed capacity is exported, Lao PDR imports one-third of required electrical energy (1,655 GWh), of which 80 percent comes from Thailand, 18 percent from China, and 2 percent from Vietnam.[65]

The Ministry of Energy and Mines (MEM) is the principal authority for overall energy policy. Under MEM, the state-owned power utility Electricité du Laos (EDL) is responsible for the electricity transmission and distribution networks and acts as a single buyer of electricity for the domestic market. The hydropower generation sector comprises the EDL-Generation Public Company (EDL-Gen) and independent power producers (IPPs). In the absence of an independent power sector regulator, MEM also takes on the role of regulator, determining the electricity tariffs. Finally, the Lao Holding State Enterprise (LHSE) is a 100 percent government-owned entity that manages government investment in power projects dedicated to exports.

63. World Bank Group, Lao PDR Economic Monitor, December 2017: Lowering Risks and Reviving Growth (Washington, DC: World Bank, 2017).

64. World Development Indicators..

65. World Bank Group, Lao PDR Economic Monitor, 2017

ASSESSMENT OF DISASTER EFFECTS ON ELECTRICITY

According to MEM and EDL, heavy rain during the flood event caused damage to distribution grids in all the provinces and disrupted the power supply in 1,091 villages. Landslides, foundation collapses, and flooding affected 24 transmission towers (230 kV and 115 kV) and three substations. The electricity supply was not interrupted by the damage to transmission and substation infrastructure, however, and no damage was reported to transmission lines and substations of IPPs.

Damage

Total damage to the electricity sector is estimated at 42.22 billion Lao kip. The damage in the distribution sub-sector was mainly caused by faults and collapsed poles in distribution lines as a result of the heavy rain. As of October 15, 2018, distribution grids in 11 provinces had already been repaired. Distribution grids in seven had yet to be repaired at this writing, however, because of budget limitations, accessibility limited by road conditions, and a limited workforce, among other factors. The cost to repair the damaged distribution grids in these seven provinces is currently being appraised. The total cost of damage to the distribution sub-sector is estimated at 26.9 billion Lao kip.[66]

Damage to the transmission and substation sub-sectors was mainly caused by landslides affecting 20 transmission towers and three substations owned by EDL. In addition, water from the Nam Ngiep1 Hydro Power Station in Borikhamxay Province (under construction) reduced the clearance between the conductor and the water surface, rendering it insufficient. The cost to repair the transmission towers is also still being determined because of the difficulty of gaining access to the sites. The total damage cost for the transmission and substation sub-sector is estimated at 15.3 billion Lao kip.[67] To date, the damage caused by the landslides to the transmission towers has been temporarily repaired, and permanent repair work is expected to start at the beginning of the dry season.Damage was not reported for transmission lines and substations of IPPs, nor for the power generation sub-sector. Safety assessments for all power generation facilities will, however, be performed in the near term following recommendations from an international expert panel (IEP).

Table 52 presents a summary of damage to assets and facilities by province.

Losses

The calculation of losses to EDL takes into account reduced revenue, higher operational costs, and additional expenses from temporary needs (demolition, removal of debris) as a result of the disaster. According to estimates from EDL, losses from reduced revenue result from a projected reduction in sales. Based on the actual demand and previous demand numbers, the total losses as a result of the floods are estimated at 3.2 billion Lao kip. Table 53 presents a breakdown of the damage and losses by province.

66. Excluding cost estimates for distribution grids in the remaining seven provinces.

67. Excluding cost estimates for two transmission towers.

Table 52 — Damage to Electricity Facilities (billion Lao kip) by Province

PROVINCE	TYPES OF DAMAGE	VALUE
Transmission lines		**14.5**
Phongsaly	Landslides at 230 kV Bountai—Namo2 (No. 131) and 230 kV Bountai—Nam Ou5 (No. 181)	1.8
Luangprabang	Landslides at 115 kV Xieng Ngeun—Kasi (No. 329); 115 kV Nam Khan3—Xieng Ngeun (No. 16); and 230 kV Nam Ou2—Pakmong2 (No. 63)	3.1
Huaphanh	Landslides at 115 kV Phonsavang—Xam Nua (No. 68, 78, 146, and 147); foundation collapse at 115 kV Phonsavang—Xam Nua (No. 35)	2.2
Xiengkhuang	Landslides at 115 kV Phonsavan—Nam Ngiep2C (No. 7); Nam Ngum5—Phonsavan (No. 5); and 230 kV Nam Ngiep2—Thavieng (No. 2, 7, and 22)	1.4
Borikhamxay	Landslides at 230 kV Thabok—Thavieng (No. 145) and 230 kV Thavieng—Lak20 (No. 228, 274, 287, and 422); flooding at 230 kV Thavieng—Lak20 (No. 278 and 354)	4.0
Xaysomboon	Water from Nam Ngiep1 at 230 kV Thavieng—Thabok (No. 26); landslide at 115 kV Nam Leuk—Nam Ngum1 (No. 64)	2.0
Substations		**0.84**
Oudomxay	Bridge collapse and landslide at 115/22 kV Namo1	0.36
Luangprabang	Landslide at 230 kV Pakmong2	0.40
Xiengkhuang	Landslide at 115/22 kV Nam Ngum5	0.08
Distribution grids		**26.88**
Vientiane Capital	Damage on the 22 kV and 0.4 kV lines	0.06
Phongsaly	Damage on the 22 kV line	3.12
Luangnamtha	Damage on the 22 kV line	0.23
Oudomxay	Damage on the 22 kV line	2.37
Bokeo	Damage on the 22 kV and 0.4 kV lines	0.37
Luangprabang	Damage on the 22 kV and 0.4 kV lines	1.84a
Huaphanh	Damage on the 22 kV line	9.13
Xayaboury	Damage on the 22 kV and 0.4 kV lines	0.08
Xiengkhuang	Damage on the 22 kV line	3.22
Vientiane Province	Damage on the 22 kV and 0.4 kV lines	0.03
Borikhamxay	Damage on the 22 kV line	0.34b
Khammuane	Damage on the 22 kV and 0.4 kV lines	0.72
Savannakhet	Damage on the 22 kV and 0.4 kV lines	0.16
Saravane	Damage on the 22 kV line	0.02
Sekong	Damage on the 22 kV and 0.4 kV lines	0.51
Champasack	Damage on the 22 kV and 0.4 kV lines	0.06
Attapeu	Damage on the 22 kV and 0.4 kV lines	4.5
Xaysomboon	Damage on the 22 kV line	0.12c
TOTAL		**42.22**

a Cost of slope protection for 115 kV Xieng Ngeun—Kasi (No. 329) and 230 kV Nam Ou2—Pakmong2 (No. 63) in Luangprabang Province is not included because estimation is not yet complete.

b Cost of slope protection for 230 kV Thavieng—Lak20 (No. 228, 274, 287, and 422) and flooding at 230 kV Thavieng—Lak20 (No. 278 and 354) in Borikhamxay Province is not included because estimation is not yet complete.

c Cost of slope protection and restringing work for 230 kV Thavieng—Thabok (No. 26) in Xaysomboon Province will be paid by Nam Ngiep1 and EDL. Cost shown is Electricité du Laos (EDL) portion only.

Source: Electricité du Laos.

Table 53 — Damage and Losses (billion Lao kip) in the Electricity Sector by Province

PROVINCE	DAMAGE			LOSSES			
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL	TOTAL EFFECTS
Vientiane Capital	0.06	-	0.06	1.6	-	1.6	1.7
Phongsaly	4.9	-	4.9	-	-	-	4.9
Luangnamtha	0.23	-	0.23	0.031	-	0.031	0.3
Oudomxay	2.73	-	2.73	0.04	-	0.04	2.8
Bokeo	0.4	-	0.4	0.0	-	0.0	0.4
Luangprabang	5.34	-	5.34	0.14	-	0.14	5.5
Huaphanh	11.3	-	11.3	-	-	-	11.3
Xayaboury	0.07	-	0.07	0.07	-	0.07	0.1
Xiengkhuang	4.7	-	4.7	0.0	-	0.0	4.7
Vientiane Province	0.1	-	0.1	0.2	-	0.2	0.3
Borikhamxay	4.3	-	4.3	0.1	-	0.1	4.4
Khammuane	0.7	-	0.7	0.3	-	0.3	1.0
Savannakhet	0.2	-	0.2	-	-	-	0.2
Saravane	0.0	-	0.0	-	-	-	0.0
Sekong	0.5	-	0.5	-	-	-	0.5
Champasack	0.1	-	0.1	0.2	-	0.2	0.3
Attapeu	4.5	-	4.5	0.2	-	0.2	4.7
Xaysomboon	2.1	-	2.1	0.0	-	0.0	2.1
TOTAL	**42.2**	**-**	**42.2**	**3.2**	**-**	**3.2**	**45.4**

SOCIAL IMPACT OF DAMAGE AND LOSSES ON ELECTRICITY

Social impact with respect to the electricity sector is considered to be the difference in expenditure on light in nighttime caused by the disaster event. It is calculated by using the following assumptions: first, each connected household uses 15 kWh/month for lighting at a tariff of 348 Lao kip/kWh, so one household would, under normal circumstances, spend approximately 5,300 Lao kip a month for lighting by electricity. Second, households disconnected from the grid would use oil for lighting at an average monthly cost of 60,000 Lao kip per household. This means one connected household would lose 57,000 Lao kip per month it is disconnected from the grid. The number of disconnected households is estimated by the difference in kWh loss and the number of households in each province. The total impact from July 2018 to August 2018 is estimated to be approximately 2.1 billion Lao kip.

RECOVERY STRATEGY AND NEEDS FOR ELECTRICITY

The total funding requirement for the recovery and reconstruction of the electricity sector has been estimated at 42.2 billion Lao kip. The following short-term activities are proposed to address the recovery needs of the transmission and distribution sub-sectors:

- **Transmission and substations:** Installation of slope protection at tower locations, improvements to reduce the sag of conductors, and repair of tower foundations for transmission lines and substations are needed. A review of transmission tower design is also recommended to assess the long-term impact of the landslides and prevent collapses in the future.
- **Distribution sector:** Repair to the distribution grids and stockpiling of spare parts for distribution grids in northern locations are needed. To improve system resilience in accordance with the "build back better" principle, a review of the distribution line routes is also recommended, with rerouting if necessary.

All of the activities are envisioned to be completed within one year after the floods. A medium-term priority, however, should be the reconstruction of transmission towers, including the restringing of conductors, if necessary.

ELECTRICITY METHODOLOGY

A rapid assessment was conducted in September 2018, followed by the post-disaster needs assessment (PDNA) conducted in September–October 2018. The data for this assessment were collected by MEM and EDL staff, together with national and international experts.

Table 54 — Impact to Users (billion Lao kip) by Province

PROVINCE	DISASTER IMPACTS TO USERS
Vientiane Capital	0.3
Phongsaly	--
Luangnamtha	0.1
Oudomxay	0.1
Bokeo	0.0
Luangprabang	0.2
Huaphanh	--
Xayaboury	0.1
Xiengkhuang	0.1
Vientiane Province	0.2
Borikhamxay	0.1
Khammuane	0.4
Savannakhet	--
Saravane	--
Sekong	0.0
Champasack	0.3
Attapeu	0.2
Xaysomboon	0.0
TOTAL	**2.1**

Source: Based on Ministry of Energy and Mines data.

Table 55 — Recovery and Reconstruction Needs (billion Lao kip) in the Electricity Sector

TIME FRAME	SUB-SECTOR	PROGRAM OF ACTIVITY	VALUE	RESPONSIBLE AGENCIES
Short-term	Transmission and substations	Installation of slope protection, sag reduction of conductors, and repair of tower foundations for transmission lines	14.5	EDL
	Transmission and substations	Installation of slope protection for substations	0.8	EDL
	Distribution	Repair of distribution grids	26.9	EDL
	Distribution	Stockpiling of spare parts for distribution grids	--	EDL
Medium-term	Transmission and substations	Reconstruction of transmission towers, including restringing of conductors if necessary	--	EDL
TOTAL			**42.2**	

Note: EDL = Electricité du Laos

Photo by Mass Media Department, MICT.

Soldiers helping a local woman in Sanamxay District.

CROSS-CUTTING ISSUES

DISASTER RISK MANAGEMENT, ENVIRONMENT, AND CLIMATE CHANGE ADAPTATION

DISASTER RISK MANAGEMENT, ENVIRONMENT, AND CLIMATE CHANGE ADAPTATION SUMMARY

Disaster Risk Management (DRM) cuts across the entire post-disaster needs assessment (PDNA) and recovery process. Strengthening DRM is critical for a recovery process that reduces risks by "building back better" and produces multiple benefits for sustainable development. A basic policy and institutional foundation for DRM is being established in Lao PDR. Although damage and losses to the sector from the 2018 floods were modest, gaps in capacities, risk knowledge, and coordination contributed to their impacts on the economy, society, and the environment. A review of the performance of Lao PDR's DRM system during the floods demonstrates the need to strengthen the current system at the national, provincial, and local levels, as analyzed below.

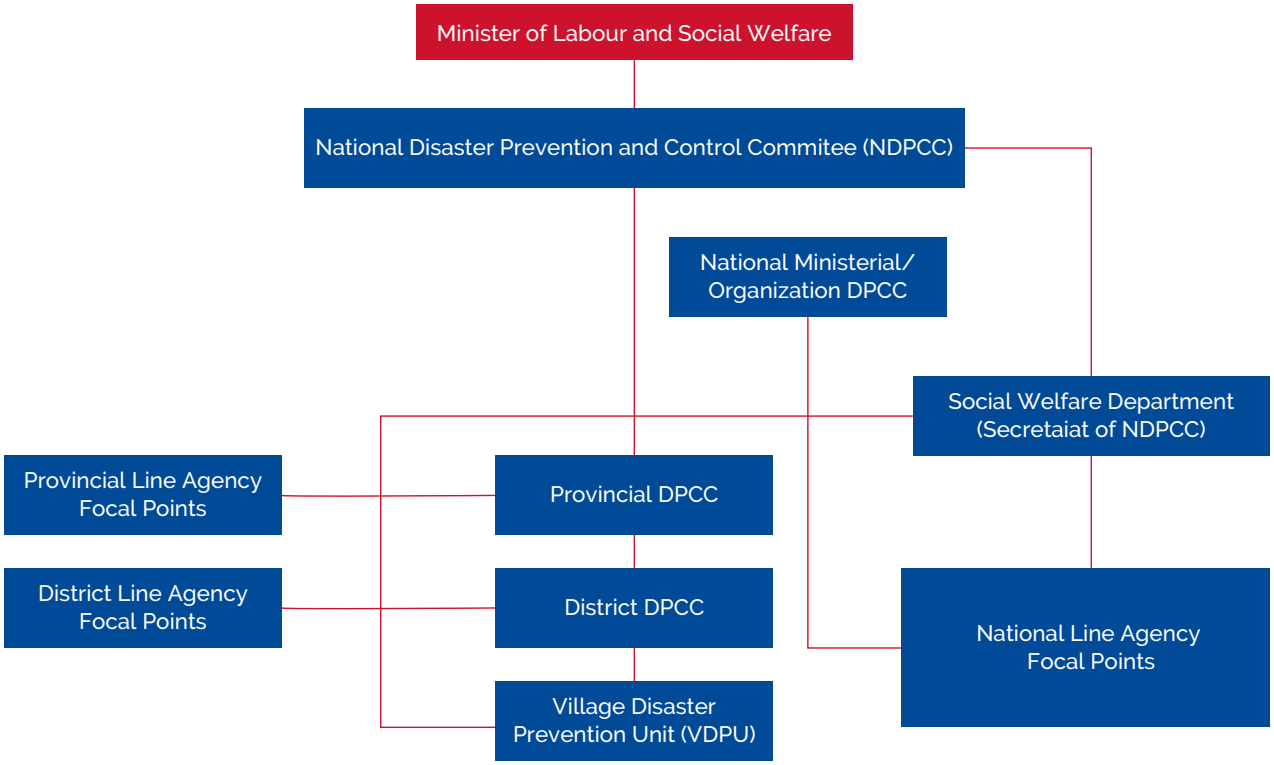
DISASTER RISK MANAGEMENT, ENVIRONMENT AND CLIMATE CHANGE ADAPTATION BACKGROUND

The ability of governments and communities to manage disaster risk effectively relies on performance related to various aspects of a comprehensive DRM system, as formulated by the Sendai Framework for Disaster Risk Reduction 2015–30, to which Lao PDR is a signatory. The priority areas of action include understanding disaster risk; strengthening disaster risk governance to manage disaster risk; investing in Disaster Risk Management for resilience; and enhancing disaster preparedness for effective response and the ability to "build back better" in recovery, rehabilitation, and reconstruction. To achieve these goals, a strong legal and institutional framework is needed, covering different stakeholders and with dedicated financial, technical, and human resources.

Lao PDR has a nascent legal and regulatory framework for DRM. The Ministry of Labour and Social Welfare (MLSW) is developing a Law on Disaster Prevention and Control, with submission to the National Assembly for approval expected in 2019. The existing Strategic Plan on Disaster Risk Management in Lao PDR 2020, 2010 and Action Plan (2003),[68] also developed by MLSW, seek to strengthen core preparedness and response functions to enhance the resilience of communities, the economy, and the environment. The draft Disaster Risk Management Action Plan for 2016–20 aims to develop comprehensive DRM programs for lead agencies and ministries that will enhance risk awareness, develop training, and improve preparedness and response. Relevant overarching frameworks include the Government of Lao PDR's Vision 2030 and Strategy 2025 and the 8th National Socioeconomic Development Plan (NSEDP, 2016–20), which sees DRM integrated into sector policies and strategies in agriculture, environment, housing, and transport. In line with this, a Plan of Action for Disaster Risk Reduction and Management for Agriculture (2014–16) is linked to the Agricultural Development Strategy (2011–20); and DRM (in terms of risk assessment, monitoring hazards, early warning, and climate change adaptation) was incorporated into the Action Plan 2020 of the Ministry of Natural Resources and Environment (MONRE).

68. https://www.preventionweb.net/english/professional/policies/v.php?id=22032.

Figure 34 — DRM Organizational and Operational Structure under MLSW



Source: MLSW.

The lead governmental agency for DRM was changed in the last decade from MLSW to MONRE; then, per Prime Minister Decree No. 75 of February 28, 2018, it reverted to MLSW. The MLSW mandate encompasses preparedness and response, recovery, and prevention. The organizational structure led by MLSW (see Figure 34) relies on coordination among the following entities:

- The National Disaster Prevention and Control Committee (NDPCC), chaired by MLSW and comprising ministerial representatives and the Lao PDR Red Cross, has a mandate to advise the Prime Minister, lead coordination among relevant agencies, and guide comprehensive DRM in a proactive manner.
- The Emergency Operations Centre of MLSW is the operational body of NDPCC, with coordination extending vertically through an Incident Command System (ICS) to disaster committees at provincial and district levels and horizontally among ministries and other relevant agencies at national and provincial levels.
- Provincial and district disaster prevention and control committees (DPCCs) are chaired by the governors at respective levels and comprise representatives of various entities, including the Lao PDR Red Cross. At the provincial level, the committees are mandated to operationalize DRM and coordinate national and international support. Provincial and district-level committees are fragmented among offices of all sectors. With limited capacity, district committees are charged with supporting villages and NGOs in local-level risk management activities and projects.
- Village disaster prevention and control committees are led by the village chiefs and include local civil defense, security, school, health, and other volunteers. They are to plan and implement local-level risk management, while training communities for this purpose.
- At the regional level, Emergency Operations Center (EOC) is linked with the Association of Southeast Asian Nations (ASEAN) Coordinating Centre for Humanitarian Assistance on disaster management, as well as the Mekong River Commission (MRC).

The Department of Meteorology and Hydrology (DMH) of MONRE is responsible for the installation, maintenance, and operation of an hydrometeorological observation network and the production and delivery of hydrometeorological service forecasts. Specifically, it has the following functions and responsibilities:

- Hydrometeorological data collection, archiving, storage, and dissemination
- Data processing and analysis, including quality control
- Weather monitoring and forecasting, and meteorological services primarily for air navigation and agriculture
- Flood forecasting
- Hydrometeorological observation network installation, maintenance, and operation
- Earthquake monitoring
- Provision of climate services and early warnings of meteorological and hydrological hazards

DMH provides meteorological information to users based on available tools and existing data from surface, satellite, and weather radar stations. Daily weather forecasts include maximum and minimum temperatures and expected weather for hydromet stations in the country. Tropical cyclone forecasts are based on the analysis of weather maps and tropical cyclone warnings derived from numerical weather prediction (NWP) products issued by global and regional forecast centers, such as the European Centre for Medium Range Weather Forecasting (ECMWF), RSMC Tokyo, the Korean Meteorological Agency (KMA), the Hong Kong Observatory, the Vietnam National Hydro Meteorological Service, and the Regional Integrated Multi-Hazard Early Warning System (RIMES), and products from other centers that are available on the Internet. MRC has adopted a series of relevant procedures for maintaining water quality, data and information exchange and sharing, water use monitoring, notification/EWS, and maintenance of flows. Private companies operating 53 hydroelectric dams are charged with regulating flows in a manner that minimizes risks, which has considerable implications for both national and transboundary flood management.

Weather forecasts and warnings for floods and severe weather events are disseminated to agencies for different sectors by telephone. Vientiane Capital City and provincial centers receive warnings through radio, TV, and newspapers. As the country is predominantly rural, the most common form of early warning, in addition to messages delivered through national and local radio, consists of warnings delivered by village chiefs, who typically receive them by telephone and communicate them to their villages and village clusters via a network of loudspeakers, occasionally mounted on motorcycles and driven around the clusters to deliver the messages.[69]

ASSESSMENT OF THE DISASTER RISK MANAGEMENT SYSTEM PERFORMANCE

The impacts of the 2018 floods were likely exacerbated by capacity gaps in the existing DRM framework and an incomplete operationalization of response. These are analyzed at various levels as follows.

National level:

- Further legal and regulatory measures, beginning with finalization and approval of the Lao PDR Law on Disaster Prevention and Control, are required to define clearly the roles and responsibilities of key ministries and sectors in the DRM cycle. By-laws and charters and emergency standard operating procedures (SOPs) are also required for these agencies.
- The NDPCC meets semi-annually and otherwise on an ad hoc basis, when disasters are officially declared. Horizontal coordination among line ministries and executive bodies during the 2018 floods was reactive and mainly improvised, often "by telephone," rather than per an organized process. The NDPCC should meet more frequently and more clearly define processes and procedures—including for preparedness and prevention, as well as response.

69. Portions of the country, accounting for approximately 4 percent of the population, are not covered by telecommunications or electricity networks. In such cases, especially where access is difficult (such as only by boat over long distances), communities are not warned with adequate lead time. Thus, there are no early warning channels with full national coverage.

- The National EOC under MLSW is nascent and needs additional human resources, technical capacity, and equipment to implement its mandate as the lead operational agency in comprehensive DRM.[70] It lacks critical information management and rapid analysis capacities at the national level and communications capabilities and resources to make ICS effective in supporting disaster committees at the provincial and district levels. Similar to NDPCC, its response and support to provinces and districts had to be accomplished with far greater effort than should have been necessary to be effective.
- The DMH infrastructure to deliver a scope of services comparable to that of other countries in the region and up to international standards is insufficient. Flood risk assessment, mapping, and dedicated flood contingency plans are outdated, lacking except at broad scale for major river basins, and/or they focus purely on water management measures, with inadequate attention to or linkage with disaster preparedness, response, and prevention. Contingency plans need to consider also the impact of private sector failure, such as in the case of the Attapeu dam outburst flood.
- Disaster losses and damage are not adequately reported and analyzed to determine the trends necessary to disaggregate losses and damage to each sector, at subnational levels as well as by sex, age, and other types of vulnerability. An effort to establish this at MLSW through better standards, protocols and procedures for field assessment, data management, analysis, and dissemination can be further supported using agreed-on standards for reporting to the Sendai Framework for Disaster Risk Reduction 2015–30 and the Sustainable Development Goals (SDGs).
- Risk-informed development is nascent but systematic and comprehensive application, monitoring, and enforcement are required. In critical sectors, such as agriculture and water, and for medium, micro, and small enterprises, prevention measures—both structural and non-structural investments—are still minimal.
- Although the Government of Lao PDR is actively taking financial measures (such as offering tax relief)[71] to reduce losses, considerable strengthening is required of budgeting, financing, and public investment planning for disaster response and prevention if the vision in the strategic plan is to be achieved.

Provincial, district, and community levels:

- The disaster committee systems at these levels are fragmented among various offices, leading to reactive response. Delays occurred in disaster response due to absent or outdated SOPs.
- Response and recovery capacity from the provincial level downward relies heavily on military, civil defense, and security entities, rather than dedicated DRM units and/or capacities (as noted in the chapter concerning governance). Enhanced coordination is needed among local entities to prepare volunteers within communities for disaster response and recovery.
- Equipment available at the provincial level and downward is limited for even basic response functions, much less prevention, preparedness, and recovery. Many provincial disaster committees possess only a few or outdated dedicated search and rescue vehicles, or they rely on civil defense or military equipment, which may or may not be suited for disaster response and recovery purposes.
- Early warning did not fully function as planned. Despite the existence of monitoring and early warning systems for the primary river basins, many communities received little if any warning of the impending flood hazard in the Attapeu incident, as well as during floods induced by tropical cyclone Bebinca. At this level, end-to-end early warning systems are not operational, which often resulted in a disconnection from response capacity of available knowledge of risks, monitoring, and means of targeting and disseminating warnings.

70. Per Prime Minister Decree No. 75 of February 28, 2018, as noted in the foregoing section of this chapter.

71. Part I, Article 7 of the December 2011 Tax Law (Amendment) stipulates special exemptions in force majeure cases or natural disasters.

- Provincial and district governments lack capacity to support local-level risk management over the medium to long term. Village- and even district-level response was largely dependent upon impromptu mobilization of available resources, and recovery and prevention was largely absent.
- The displacement of severely affected populations from their settlements and "safe" areas increases their vulnerability (see the Unexploded Ordinance (UXO) chapter). No dedicated contingency plans, procedures, or even awareness exist concerning how to manage this compound risk.

ASSESSMENT OF DISASTER EFFECTS ON DISASTER RISK MANAGEMENT, ENVIRONMENT, AND CLIMATE CHANGE ADAPTATION

The DRM sector was not substantially affected by the floods in terms of damage, but it was highly overextended in terms of capacity. The limited DRM equipment available, such as public search and rescue trucks and accompanying equipment, fire trucks, communications equipment, and so on, was utilized to the maximum for disaster response and certainly suffered some depreciation and damage. Based on the field visits and reports from the provincial offices, water-level monitoring instruments were affected by the floods, including in Oudomxay Province in the districts of Pakbeng, Houn, Xay, and La. As disaster committees are located within government offices, the assessed value of damage to these offices and to village loudspeaker systems are covered in the governance chapter. Losses were not calculated for the DRM sector.

Assessment of environmental issues and impacts was included across various sectoral chapters, with landslides and slope instability covered in the transport chapter; riverbank stability and erosion covered in the waterways chapter; and plantations and forestry covered in the agriculture chapter. In terms of pollution, although the flood had some temporary effects on water quality (turbid rivers with heavy sediment loading), no serious water contamination occurred. The climate change issues and impacts were also integrated across other sectors. With regard to the hydromet sector, equipment in four provinces and its replacement should be covered in the short term.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON DISASTER RISK MANAGEMENT, ENVIRONMENT, AND CLIMATE CHANGE ADAPTATION

As described in other chapters, the 2018 floods had major impacts on people and society. With more effective early warning, preparedness plans, and Incident Command System, lives and other movable assets could have been saved and impacts mitigated.

RECOVERY STRATEGY AND NEEDS FOR DISASTER RISK MANAGEMENT, ENVIRONMENT, AND CLIMATE CHANGE ADAPTATION

To remedy the identified capacity gaps, manage the aftermath of the 2018 floods, and improve disaster resilience, short-, medium-, and long-term recovery needs were identified. Short-term needs relate to the replacement of damaged assets, such as government buildings that house staff involved in DRM and equipment needed for disaster response, preparedness, weather forecasting, and early warning systems. In the medium to long term, it is vital that the affected sectors integrate and institutionalize multihazard DRM measures into their strategies, plans, procedures, and operations. Measures to address selected needs in five areas are outlined below.

To protect the gains made from recovery and building back better, it is essential that all affected sectors, especially those most affected, integrate and institutionalize DRM measures into their strategies, plans, procedures, and operations. Therefore, to enhance the disaster resilience of Lao PDR via the Disaster Recovery Framework (described in the final chapter), its DRM system must be considerably strengthened. DRM measures should address the risks posed by multiple hazards, as well as avoid addressing one risk while aggravating another. The measures outlined below provide a minimal, thematically organized specification of these needs.

1. Enhancing institutional, policy, legal, and regulatory environment:

    - **Finalize and ratify the Lao PDR Law on Disaster Prevention and Control** specifying roles and responsibilities of key ministries and sectors in the DRM cycle—for example, specify the NDPCC processes and procedures that are to become fully institutionalized and proactive, consolidate provincial and district disaster committees into cohesive units over the medium to long term, establish protocols between the government and development partners for requesting and delivering international assistance, and address the needs of vulnerable social and ethnic groups.

      Based on the law, draft and approve charters and other bylaws for the relevant agencies and sectors and sub-sectors, such as agriculture, irrigation, hydroelectric dams, household water supply, health, and social protection.[72] Develop a national disaster risk financing strategy with appropriate risk financing instruments in line with the different risk levels.

    - **Support the development and implementation of an integrated strategy and programs for risk-informed SDGs** at the local level, particularly in provinces/districts most affected by floods and vulnerable to future risks.

2. Improving disaster and climate risk assessment and better managing information for DRM:

    - Strengthen the collection, reporting, and analysis of disaster losses and damage data to support better targeting of sectoral plans for reducing future damage and losses.

    - Improve the DRM and climate risk management capacities of members of the National Disaster Prevention and Control Committee (national and subnational levels) to enhance evidenced-based planning for integrated and comprehensive disaster and climate risk reduction.

    - Enhance risk assessment capacities of EOC and other relevant entities (such as the Department of Hydrometeorology in MONRE) to target and plan comprehensive DRM better.

    - Conduct flood risk mapping, with appropriate assessment methods applied to outburst (dam), riverbank (Mekong River and backup of tributaries), and flash (mountain) floods.

    - Develop capacity for timely decision support systems (for example, rapid and background analysis within EOC) to support end-to-end early warning/early action, rapid damage assessment, and post-disaster damage and needs assessment, as well as recovery frameworks.

    - Strengthen the information management and ICT capacities of the national-level EOC and its provincial and district disaster committees. Strengthening capacity to manage and prevent disasters, raise risk awareness, and provide education

    - Carry out regular training, exercises, and simulations with disaster committees, in coordination with civil defense and security and community response and recovery entities.

    - Conduct training of trainers and develop specialized modules for relevant entities; provide necessary facilities and equipment, both within EOC and onsite.

    - Execute evidence-based advocacy, awareness, and training in risk-informed development for the most affected and vulnerable sectors of the economy, population, and environment.

    - Educate the population and raise awareness in managing compound risks posed by UXO, beginning with the most contaminated and flood-prone locales.

3. Strengthening hydrometeorological service delivery end-to-end early warning systems

    - Strengthen the linkage of EOC with provincial and district units, including development and testing of SOPs at all levels; establish rapid analysis capabilities within EOC; and provide the necessary equipment.

    - Enhance coordination and partnership with relevant entities to establish end-to-end early warning systems: risk assessment and rapid analysis (by EOC); monitoring of hazards (meteorological by MONRE, agrometeorological by Ministry of Agriculture and Forestry (MAF),

72. Bylaws are drafted and approved by the ministry or other entity, pending review by the Ministry of Justice.

and so on); messaging and dissemination of warnings (via mobile phones, radio, TV, village loudspeakers); and on-call response capacities (EOC and first responders at all levels). Target high-risk areas and sectors, such as agriculture and privately managed dams and communities downstream of these structures.

- Improve coordination among EOC, disaster committees, military, civil defense, and security units within ICS at all levels in support of response and recovery, including joint training and exercises and development of village volunteer capacities.
- Enhance service delivery of hydrometeorological information by strengthening communication and interaction with end users; streamline mechanisms for issuing and disseminating early warnings; enhance public weather and hydrological services; improve communication to vulnerable communities and critical agency users (including through ICS and socially and linguistically relevant modes); deliver specialized services to key users (for example, drought monitoring for agriculture, water resources management, energy, urban planning and development, and transport); and improve links with global and regional partners and countries.
- Strengthen hydrometeorological capacity by enhancing staff technical and management capacities (including observation networks and innovative tools for forecasting); develop a national institutional framework for hydrometeorological forecasting and early warning services, with clear roles and responsibilities for the involved institutions; and establish an institutional mechanism between the hydrometeorological services and early warning services providers and users.
- Improve the observation network, ICT infrastructure, and forecasting capabilities by designing and/or rehabilitating existing observation networks; establish an operational maintenance program; strengthen ICT infrastructure; introduce modern tools and methodologies (including ensemble prediction systems and probabilistic forecasting); introduce impact-based forecasting for severe hazards; strengthen dissemination and communication channels and technologies; and establish a national flood database.

4. Preventing and mitigating disasters

- Establish or develop planning, procedures, and operations for risk-informed development, proceeding from the Disaster Risk Management Action Plan, while ensuring the needs of especially vulnerable social and ethnic groups are taken into account.
- Pilot climate-informed, replicable activities in high-risk areas and sectors and ecosystem service-based DRM, with multiple benefits and capacities for such among EOC, district and provincial staff, and relevant line ministries.
- Improve management of the reserve fund for disasters, integration of DRM into medium-term expenditure frameworks, and application of public investment planning/screening tools and procedures, as well as dissemination of disaster-related information by MLSW to concerned government entities at national and provincial levels, focusing upon the highest risk sectors.
- Encourage the private sector to strengthen business continuity planning, including incentives or regulation.
- Coordinate and control the regulation of flows between dams managed by private entities (see chapters on infrastructure and energy).

DISASTER RISK MANAGEMENT, ENVIRONMENT, AND CLIMATE CHANGE ADAPTATION METHODOLOGY

This analysis was based on consultations with MLSW, MONRE, relevant ministries, the Red Cross, and communities. Baseline data provided by MLSW and MONRE and subsequent analyses were reviewed and then verified through field assessments, focus group discussions with communities, and interviews with provincial and district government disaster committees in the provinces of Vientiane Capital, Oudomxay, Khammuane, Savannakhet, and Attapeu to capture both "top-down" and "bottom-up" perspectives.

Table 56 — Recovery and Reconstruction Needs in the Disaster Risk Management, Environment, and Climate Change Adaptation Sector

FIELD	PROGRAM OF ACTIVITY	VALUE (BILLION LAO KIP)	RESPONSIBLE AGENCIES
SHORT-TERM RECOVERY NEEDS (ONE YEAR)			
DRM and high-risk sectors	Formulate National Disaster Law, charters, SOPs for EOC, DPCCs, and line ministries.	0.79	NDPCC; EOC/MLSW; MOJ; National Assembly
DRM	Conduct a needs assessment for ICS decision support systems and risk assessment.	0.77	EOC/MLSW; DHM and hazard monitoring agencies; DPCCs
DRM	Establish rapid analysis and communications linkage for ICS from EOC to DPCCs.	1.64	EOC/MLSW
DRM, energy, and water	Provide SOPs and specifications for early warning system for communities downstream of high-risk dams; conduct training/exercises.	2.40	EOC/MLSW; DPCCs; DHM; private sector dam operators
DRM and high-risk sectors	Conduct training on risk knowledge and application of NDPCC levels, focusing on MPI, EOC/EOC/MLSW, and DPCCs.	0.62	EOC/MLSW; NDPCC; MPI; line ministries; provincial and district governments; DPCCCs
DRM and high-risk sectors	Develop risk-informed planning procedures proceeding from the National Strategy on Disaster Management.	1.36	EOC/MLSW; NDPCC; MPI; line ministries; provincial and district governments; DPCCs
DRM and finance	Develop a national disaster risk financing strategy.	0.94	ECO/MLSW; MPI; MOF
DRM, agriculture, environment	Develop an integrated strategy and program for risk-informed SDGs at the local level, and start with risk management pilots.	7.70	EOC/MLSW; MAF; MONRE; village chiefs and communities
DRM and private sector	Engage and mobilize funds for disaster mitigation, preparedness, response, and recovery.	1.03	EOC/MLSW; private sector; provincial and district governments; DPCCs
SUBTOTAL SHORT-TERM NEEDS		**17.25**	
MEDIUM-TERM RECOVERY NEEDS (TWO YEARS)			
DRM	Secure approval by PM decree of a National Disaster Rapid Response and Assessment Team from top to bottom, consolidating DPCCs into cohesive units.	1.03	NDPCC; General Assembly; MLSW; provincial and district governments; DPCCs
DRM	Provide facilities and equipment for the above.	10.27	NDPCC; General Assembly; MLSW; provincial and district governments; DPCCs
DRM	Strengthen national and establish local disaster management funds to cover financial gaps, with adequate tracking system for nation- and sector-wide DRM expenditures.	1.11	EOC/MLSW, MOF, provincial governments; DPCCs
DRM	Conduct (riverbank, dam outburst, and flash) flood and drought risk mapping, and update multihazard risk assessments.	10.27	EOC/MLSW, MAF, DHM/ MONRE, MRC
DRM	Continue to train EOC in rapid analysis/ assessments.	5.13	EOC/MLSW
DRM	Strengthen communications and information management between EOC and provincial and district disaster units, conduct training in risk-informed planning and innovation in response and recovery, and conduct operational exercises and simulations.	6.42	EOC/MLSW; DPCCs
DRM, energy, water, and infrastructure	Establish emergency SOPs for hydroelectric dams (simulation exercises, risk identification, evacuation, and facility preparation).	5.99	EOC/MLSW; energy and water management agencies; private dam operators; local governments and disaster units

FIELD	PROGRAM OF ACTIVITY	VALUE (BILLION LAO KIP)	RESPONSIBLE AGENCIES
DRM	Establish end-to-end early warning system for high-risk areas, including those downstream of dams and others identified in risk assessment and community screening procedures.	17.11	EOC/MLSW and local units, DMH, hazard monitoring agencies, media and telecom; provincial and district governments
DRM and high-risk sectors	Establish SOPs, revise charters, and provide training in risk-informed planning, budgeting, and investment screening for EOC/MLSW, vulnerable/critical sectors, and MPI.	12.84	EOC/MLSW, MPI; line ministries
DRM	Develop training center and capacities.	11.12	EOC/MLSW
DRM	Strengthen local risk management, including joint training with military, civil defense, and security units.	17.97	EOC/MLSW; MAF; MONRE; village chiefs and communities
DRM and private sector	Support business continuity and corporate social responsibility for DRM.	6.85	EOC/MLSW; private sector; provincial and district governments; DPCCs
SUBTOTAL MEDIUM-TERM NEEDS		**106.11**	
LONG-TERM RECOVERY NEEDS (THREE TO FIVE YEARS)			
DRM	Consolidate DPCCs into cohesive units, conduct trainings and simulations in operational ICS, and provide risk-informed planning and support to provincial governments.	7.70	EOC/MLSW; DPCCs; provincial and district governments
DRM	Institutionalize/further capacitate information management, rapid analysis, and risk assessment; establish iterative update process for risk assessment with post-event analysis.	6.85	EOC/MLSW; hazard monitoring agencies
DRM, energy, and water	Establish regulations for and improve coordination of releases from hydroelectric dams.	3.00	Energy
DRM and high-risk sectors	Institutionalize risk-informed planning, budgeting, and investment screening for EOC/MLSW, critical sectors, and MPI.	6.85	ECO/MLSW; MPI; provincial and district governments
DRM and high-risk sectors	Replicate pilots for local-level risk management.	21.39	EOC/MLSW; MAF; MONRE; village chiefs and communities
DRM and private sector	Promote business continuity and corporate social responsibility for DRM.	6.85	EOC/MLSW; private sector; provincial and district governments; DPCCs
SUBTOTAL LONG-TERM NEEDS		**52.63**	
TOTAL		**175.99**	

Note: DMH = Department for Meteorology and Hydrology; DRM = Disaster Risk Management; MAF = Ministry of Agriculture and Forestry; MOF = Ministry of Finance; MLSW = Ministry of Labour and Social Welfare, MPI = Ministry of Planning and Investment; Ministry of Agriculture and Forestry, MOJ = Ministry of Justice; MONRE = Ministry of Natural Resources and Environment; NDPCC = National Disaster Prevention and Control Committee

GOVERNANCE

GOVERNANCE SUMMARY

Governance entities provide vital public goods and services and, in disaster situations, maintain the rule of law in the affected areas. The civil defense system at the local level also plays a lead role in disaster response and humanitarian assistance. This analysis primarily focuses on the damage and losses incurred by the governance sector at the subnational level. Key needs identified pertain to repair of administrative buildings, documentation, mapping, and communications and early warning services. The overall damage related to administrative village offices amounts to an estimated 10.24 billion Lao kip, based on rapid data collection from eight villages in two provinces (Attapeu and Oudomxay). Proxy figures based on reporting from the Ministry of Labour and Social Welfare (MLSW) show a total of 780 affected villages with estimated total damage of 131.351 billion Lao kip. The needs identified through rapid data collection are estimated to be, at minimum, 72.71 billion lao Kip over the long term. Needs in governance at the national level are covered in the Disaster Risk Management chapter of this report.

GOVERNANCE BACKGROUND

The following executive bodies are charged with overall supervision and support of governance in Lao PDR at the provincial, district, and community levels: the Ministry of Home Affairs (MOHA), which issues official documents, such as personal identification and others; the Ministry of Justice (MOJ), which adjudicates claims resolution and provides family notary services; the Ministry of Public Security (MPS), which maintains public order and supports first responders during disasters and identifies disaster fatalities; the Ministry of National Defense (MND), which supervises the Lao People's Army and local civil defense within communities and often acts as the first responder at the community and other levels; and the Ministry of Information, Culture, and Tourism (MICT), which is charged with disseminating information during disasters, including early warning via media (television and radio stations and their extended network of loudspeakers at the village level). These line ministries are represented across all provincial and district capitals to ensure the delivery of public services down to the village level. Aside from the functions noted, local governance bodies also play a key role in managing public, private, and international aid for recovery.

ASSESSMENT OF DISASTER EFFECTS ON GOVERNANCE

Governance entities suffered damage to administrative offices and communications facilities in the flood-affected areas, with some washed away. In some cases, equipment necessary to performing the mandated tasks of the ministries (such as mapping, the production and archiving of official documents, communications, and so on) was also damaged and left in need of repair or replacement and, in some cases, upgrading for enhanced efficiency in a safe environment. Examples of damage and losses to the different sub-sectors are described below and summarized in Tab.

Damage

MOHA and MPS: The cost of damage related to the reissuance of vital official documents by MOHA and citizen management under MPS is estimated to reach 1.2 billion Lao kip. The village administrative offices of eight local authorities were damaged, including those in Ban Mai, Ban Thahin, Ban Hinlat, Thasaengchanh, Ban Samong, and Ban Thair in Attapeu Province and Ban Mokphong and Ban Phoulaung villages in Oudomxay Province. Damaged assets included recorded documents, electrical equipment, and other utilities in the offices. Important documents related to citizen registration, such as birth and marriage certificates and those pertaining to divorce, death, change of name, and migration were washed away. In Sanamxay, census and identification cards were damaged and need to be reissued. The estimated total value of damage to these offices for the eight villages is 1.25 billion Lao kip, with average damage per village estimated at 0.156 billion Lao kip. (A proxy calculation based on this figure and on data provided by MLSW produced a total damage estimate of 121.68 billion Lao kip for administrative village offices in 780 affected villages in nine provinces.

Since these other villages were not directly assessed, however, only potential damage can be estimated, as noted in Table 57).

Damage affecting the services of the Mapping Department of MOHA across villages in Attapeu Province included the loss of information on coordinates, level points, and other assets needed for mapping. The loss of this information will cause extreme delays in locating the exact positions or boundaries of houses, temples, cultivated areas, and other infrastructure. The total damage to mapping within Attapeu is estimated at 0.29 billion Lao kip.

MICT: In some 19 villages in Attapeu, 40 sets of loudspeakers belonging to MICT were damaged, including loudspeakers located at offices and radio stations in 6 villages. Other affected provinces accounted for 150 sets of damaged loudspeakers, for a total of 190 loudspeaker sets affected across the country. The total estimated damage was 6.98 billion Lao kip. In Sanamxay, the radio station was upgraded as part of early recovery response.

MPS and MND: These entities incurred damage to equipment utilized during the response to the 2018 floods. Because data are unavailable, the value cannot be calculated.

Sector total: Combining the estimates for all sub-sectors produces a total proxy cost of damage to governance of 131.351 billion Lao kip. Note that this proxy figure does not accurately reflect the real situation, since the report of the post-disaster needs assessment (PDNA) secretariat failed to capture the exact number of affected villages in the provinces. Furthermore, not all of the related line ministries provided information on time.

Losses

Calculating losses to governance through the rapid PDNA process proved infeasible. Losses are, however, considered substantial and include changes in flows of income in all governance sub-sectors resulting from reduced quality, quantity, and timeliness of governance functions and services, as well as lower revenues and higher costs.

RECOVERY STRATEGY AND NEEDS FOR GOVERNANCE

Reconstruction and recovery needs for the governance sector include rebuilding and improving facilities and equipment to cope with increases—or recovery from flood-induced lapses—in the demand for functions and services, as well as maintaining or replacing missing staff. As both national and local governance entities play key roles in managing public, private, and international aid during recovery, it is important to strengthen managerial and technical capacities to conduct essential tasks. Recovery needs are presented below, by ministry.

MOHA identified the following needs for recovery and to mitigate the impacts of future disasters:

- Local administrative offices need to be repaired, retrofitted, and, in some cases, relocated to areas less exposed to natural hazards, such as floods. Losses of equipment, vehicles, and cash assets must be recompensed. Administrative offices that house provincial and district disaster committees require generators and other equipment to ensure their survival and their ability to function in their roles as part of the Incident Command System for disaster response (led by the Emergency Operations Center of the Ministry of Labour and Social Welfare, as described in the Disaster Risk Management chapter).
- The Citizen Management Department of MOHA (in coordination with MPS) needs to recover its capability to (re)issue vital official documents, the lack of which adversely affects critical governance services. These include documents needed for identification and travel (such as birth certificates to meet passport requirements) and other documents required for civil registration (birth, death, marriage, and so on).
- Mapping should be restored in the short term. If the capacity of MOHA to map property within the flood-affected areas is not quickly restored, considerable errors will be made in delineation, which will adversely affect recovery efforts, particularly in the housing sector and the private domain (for example, with regard to agriculture and local businesses). If boundaries are not properly reestablished, "building back better" will prove impossible, and disputes and conflict will become more likely, if not inevitable.

Table 57 — Damage and Proxy Figures (billion Lao kip) for the Governance Sector

MINISTRY	DESCRIPTION OF AFFECTED ITEMS	DAMAGE	PROXY FIGURES
MOHA	Administrative mapping	0.29	0.29
	Administrative village offices	1.25	121.680
MOHA and MPS	Citizen management/important documents	1.20	1.20
MICT	Mass media/Information dissemination	6.98	6.98
MOJ	Assets related to family notary and child justice services	0.52	1.201
TOTAL		**10.24**	**131.351**

Source: Proxy figures are based on MLSW data.

Note: MICT = Ministry of Information, Culture, and Tourism; MOHA = Ministry of Home Affairs; MOH = Ministry of Justice; MPS = Ministry of Public Security; MOJ = Ministry of Justice.

Table 58 — Disaster Recovery and Reconstruction Needs

SHORT-TERM (ONE YEAR)		
PROGRAM AND/OR ACTIVITY	**VALUE (BILLION LAO KIP)**	**RESPONSIBLE AGENCIES**
Repair and replacement of mapping equipment	0.29	MOHA
Repair and replacement of administrative village offices	1.50	MOHA
Reissuance of vital documents	1.44	MOHA and MPS
Training and equipment for DNA identification	0.95	MPS
Repair and replacement of public information systems	6.98	MICT
Additional facilities	0.58	MOJ
SUBTOTAL SHORT-TERM	**11.69**	
LONG-TERM (THREE TO FIVE YEARS)		
Improvement of mapping equipment	0.29	MOHA
Expansion of public information systems	59.68	MICT
Additional facilities	1.05	MOJ
SUBTOTAL LONG-TERM	**61.02**	
TOTAL	**72.71**	

Note: MICT = Ministry of Information, Culture, and Tourism; MOHA = Ministry of Home Affairs; MOH = Ministry of Justice

Table 59 — Summary of Needs (billion Lao kip) by Sub-sector

RECOVERY NEEDS	SHORT-TERM	LONG-TERM	TOTAL NEEDS
MOHA mapping	0.29	0.29	0.58
MOHA administrative village offices	1.5	0	1.5
MOHA and MPS	1.44	0	1.44
MPS	0.95	0	0.95
MICT	6.98	59.68	66.66
MOJ	0.53	1.05	1.58
TOTAL	**11.69**	**61.02**	**72.71**

Note: MICT = Ministry of Information, Culture, and Tourism; MOHA = Ministry of Home Affairs; MOJ = Ministry of Justice; MPS = Ministry of Public Security

- Finally, MOHA's human resource capacity needs to be further developed so critical governance services can be maintained during floods and other disasters.
- **MICT** needs to reequip some offices and radio stations affected by the disaster and reinstall the 40 loudspeaker sets that were damaged in 19 villages in the most heavily affected areas of Attapeu Province, as well as the other 150 loudspeaker sets damaged nationwide. In line with the build back better principle, these replacement loudspeakers would also become part of an early warning system.

MOJ needs to be in a position to meet any increased demand for family notaries due to the floods. Additional facilities (mobile units) and staff will be needed, as well as capacity development.

MPS seeks to improve its capacity through training and exercises to maintain public security during and after disasters, as well as to upgrade its technical capabilities for identifying bodies.

The MND-Disaster Response Unit regards training and exercises as key to capacity development within the Lao People's Army. Other priorities include establishing additional search and rescue and medical emergency response teams and strengthening existing ones. This will require additional expertise, knowledge, and technical skills and best practices learned from both national and international entities. These needs are included in the Disaster Risk Management (DRM) chapter.

Photo Credit: Department of Citizen Management, MOHA.

Temporary accommodation and facilities in Sanamxay District, Attepeu Province, October 17, 2018.

UNEXPLODED ORDNANCE (UXO)

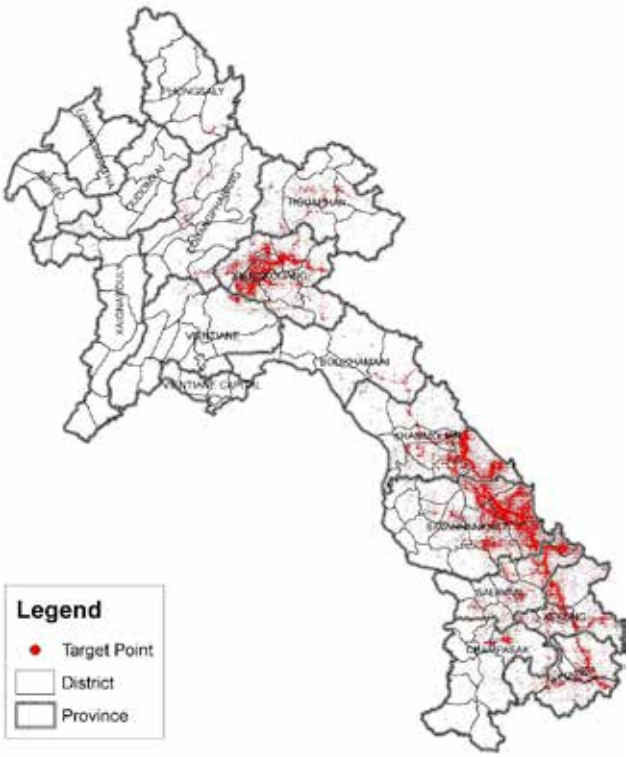
UXO SUMMARY

Contamination by unexploded ordnance (UXO) is a preexisting, exogenous condition that poses a compound risk during and after floods and other hazard situations. Movement of UXO is a concern for all areas where upper soil layers were swept away in the 2018 floods as a result of the dam break in Attapeu, flash floods, and landslides. In areas where people have been displaced or where people and structures have to be relocated, UXO requires special and immediate attention to avoid complicating recovery efforts. To ensure the safety of returning or relocated flood-affected populations, assets, and infrastructure, the mandated lead agencies for UXO and Disaster Risk Management should integrate the cost of survey and (if required) clearance of UXO into their planning and budgeting.

UXO BACKGROUND

During the Second Indochina War (1964–73), more than two million tons of explosive ordnance were released in Lao PDR, making it, per capita, the most heavily bombed country in the world. Historical data indicate UXO contamination is present in much of Lao PDR, as indicated in Table 60, Figure 35 and Figure 36,[73] mainly in rural areas, including agricultural lands, some residential zones, and public facilities.[74] The consequent need for survey and (if required) clearance increases the costs of construction, agriculture, and other projects across all sectors.[75] And while the use of detection equipment provides safety for those who survey and clear the land of UXO, dozens of people are injured or killed annually when they accidentally detonate explosives during, for example, land clearing, logging operations, excavation, or construction on poorly surveyed land. This is a particular concern when relocating displaced disaster victims or engaging in reconstruction in potentially contaminated areas.

Figure 35 — Indicative Map of UXO Contamination in Lao PDR per U.S. Air Force Bombing Data (1968–73)



Source: U.S. Air Force Bombing Data Map for Lao PDR, 1968–73.

The UXO sector falls under the leadership of the National Regulatory Authority for the UXO/Mine Action Center (NRA), which is charged with coordinating and regulating survey and clearance operations; the Lao National Unexploded Ordnance Programme (UXO Lao) is the main humanitarian operator. Aside from survey and clearance, NRA and UXO Lao engage in UXO education and awareness raising in schools and communities. These organizations, with considerable support from the international community, have adequate capacity to carry out their work, and they support in turn volunteer teams at the community level.

73. Contamination includes "cluster munitions," large aircraft bombs, rockets, grenades, artillery munitions, mortars, and other unexploded ordnance. Submunitions (that is, parts of cluster munitions that separate during deployment) are the most common form of UXO remaining. Approximately 80 million unexploded submunitions remained in Lao PDR after the war.
74. The nine most contaminated provinces are Attapeu, Champasack, Huaphanh, Khammuane, Luangprabang, Saravane, Savannakhet, Sekong, and Xiengkhuang. An estimated 41 out of the 46 poorest districts in Lao PDR have UXO contamination.
75. In 2017, 95 percent of the land cleared by five humanitarian clearance operators was agricultural.

Table 60 — Scale of UXO Contamination in Lao PDR

ADMINISTRATIVE DIVISIONS	TOTAL DIVISIONS	DIVISIONS WITH UXO CONTAMINATION	DIVISIONS WITH CLUSTER MUNITIONS CONTAMINATION ONLY
Provinces	18*	17	15
Districts	143	110	83
Villages	8,643	3,860	2,873

*Comprising 17 provinces and 1 municipality (Vientiane Capital).

Source: National Regulatory Authority for the UXO/Mine Action Sector in Lao PDR.

ASSESSMENT OF DISASTER EFFECTS ON UXO

Although the 2018 floods did not cause any damage to the UXO sector, they increased uncertainty regarding the location of unexploded ordnance. The most contaminated areas in which the 2018 floods were most severe include the provinces of Attapeu, Khammuane, Savannakhet, and Oudomxay.[76] Figure 36 illustrates the overlap of flood-affected and UXO-contaminated areas in Sanamxay District, Attapeu Province (analyzed further below). While losses have occurred in terms of perceived risks posed by UXO during the 2018 floods, these could not be quantified as part of this assessment.

The movement of UXO during floods depends on the type of flood and the type of ordnance. Unexploded cluster munitions pose the greatest risk, as their average depth is around 25 cm, with large bombs considerably deeper. The movement of UXO is most likely where dam outbursts (such as in Attapeu Province), flash floods (in mountain and foothill areas), or landslides have washed away the topsoil and other layers to a depth of 25 cm or more.[77] The following issues relating to the 2018 floods are of special concern and require further inspection:

- The depth of debris deposited by the floods will affect the type of work required, particularly in Attapeu Province. For this reason, UXO Lao has, at the request of the Governor of Attapeu Province, deployed an Explosive Ordnance Disposal team on standby for Sanamxay District.
- The accurate number of hectares affected and the type of land use will require further validation to target and prioritize long-term tasks at this scale.
- Specific social services facilities, like schools and health centers, may need some special inspection before full reconstruction.

SOCIAL IMPACT OF DAMAGE AND LOSSES ON UXO

Any deaths or injuries due to UXO will exacerbate the conditions of the affected people, particularly those who have already lost family members, houses, or employment or other production assets. In the areas where UXO movement is likely and, hence, accidental risk of detonation is also likely (but can only be confirmed by ground-truthing[78]), the following are possible adverse impacts:

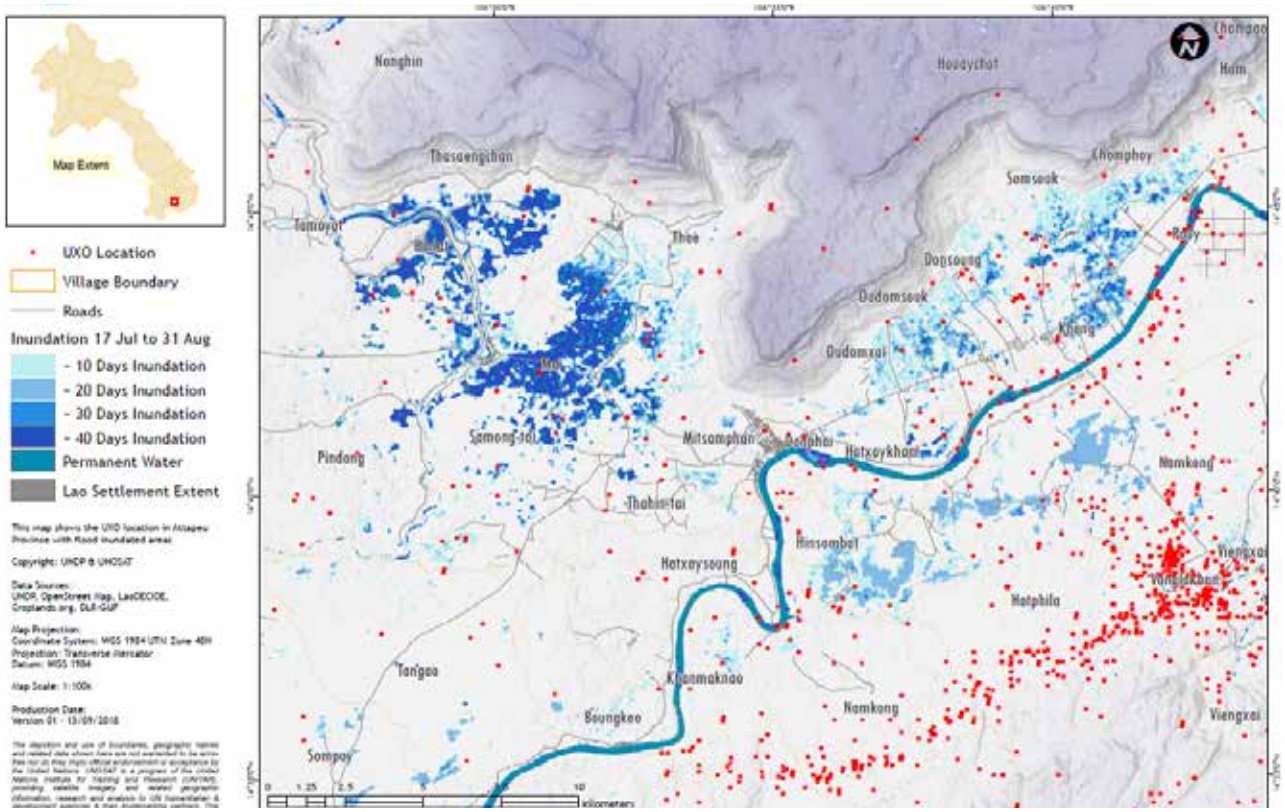
- Displaced persons may build temporary or permanent housing, clear land, and/or build cooking fires outside of recognized "safe" areas in their own communities.
- People may be hesitant to return to their dwellings if they are uncertain of the presence of UXO after the floods, or they may return without knowing the risks.

76. In terms of flood-affected districts, 4 of the 10 districts in Khammuane (Boualapha, Gnommalat, Mahaxai, and Xaibouatong) and 7 of the 15 in Savannakhet (Atsaphangthong, Atsaphon, Nong, Phalanxai, Phine, Sepon, and Vilabuly) are severely contaminated by UXO. The areas affected are mostly agricultural.

77. Seismic or geophysical hazards pose the greatest threat in this respect. The most contaminated provinces with moderate seismic risk include Xaysomboon, Xiengkhuang, Huaphanh, and Luangprabang. Contaminated provinces with a high susceptibility to landslides include Sekong, Attapeu, and Xaysomboon. Those with moderate landslide susceptibility include Khammuane and Saravane.

78. With regard to UXO, "ground truthing" means precise onsite survey confirmation and more detailed location of what has been mapped or imprecisely surveyed to date.

Figure 36 — Sanaxay District UXO Location and Flood Inundation Map



Source: United Nations Development Programme (UNDP)-UNOSAT, 2018.

- In an effort to restore their livelihoods and sources of food, farmers may immediately return to cultivating their farmlands without certainty that the farms are UXO-free.
- Repair and reconstruction of roads, bridges, schools, clinics, and other public and private assets may encounter higher levels of risk and cost when not properly cleared of UXO.

RECOVERY STRATEGY AND NEEDS FOR UXO

Owing to the imprecise nature of available data and the immense scale and cost of full clearance, integrating UXO into recovery frameworks and plans will require careful prioritization. A major national survey initiative focused on cluster munitions is underway to provide geographical area contamination details in the form of "confirmed hazardous areas." The product of the survey will inform long-term resource planning, prioritization, and clearance for the sector.[79]

79. In recent years, a results-oriented methodology has evolved for identifying, prioritizing, and clearing confirmed contaminated areas. Continued development and expansion of these processes has significantly increased the amount of UXO being identified and destroyed.

Table 61 — Reconstruction and Recovery Needs within Provinces Prioritized for UXO Clearance Operations

PROVINCE	SHORT-TERM NEEDS (HECTARES)	LONG-TERM NEEDS (HECTARES)	TOTAL NEEDS (HECTARES)	TOTAL NEEDS (BILLION LAO KIP)
Attapeu	306	1,800	2,106	44.8
Khammuane	400	23,500	23,900	507.9
Savannakhet	400	10,500	10,900	231.6
Oudomxay	144	Not yet surveyed	144	3.1
TOTAL	**1,250**	**35,800**	**37,050**	**787.3**

Source: National Regulatory Authority for the UXO/Mine Action Sector in Lao PDR.

The risks associated with UXO will require the dedication of considerable time and resources to prevent injuries to the people in the flood-affected areas. Additional UXO risk education is planned in Sanamxay District by UXO Lao, and other actions are being considered for Khammuane Province. A total of 787 billion Lao kip is needed to expedite the clearance operations. Initial survey and ground-truthing are required, however, before clearance can begin. Given the amount of resources required for the task ahead, even this must be carefully prioritized. In line with these conditions, the following strategies and activities are proposed:

- Prioritize the survey and confirmation of UXO presence in residential areas, agricultural land, and areas where repairs are needed to vital infrastructure. The immediate need of the sector is the clearance of UXO in resettlement areas in Sanamxay District, Attapeu Province, and identified areas in Oudomxay Province. Savannakhet and Khammuane provinces are very severely contaminated by UXO, especially by cluster munitions, and some of the flood-affected districts are also the most severely contaminated.
- Conduct a systematic, comprehensive survey to quantify the extent of actual UXO contamination in highly affected provinces, such as Khammuane and, similarly, Savannakhet.
- Coordinate resource mobilization within the UXO sector to fill gaps in the identified priority areas.
- Strengthen UXO risk education for local communities and humanitarian actors.

Table 61 translates into short- and long-term actions the needs of the UXO sector for recovery from the 2018 floods.

UXO METHODOLOGY

The existing data on UXO in Figure 36 provide only a general indication of its location, as they are based on U.S. military bombing data (1964–73) and preliminary surveys. To assess the interface between UXO and the 2018 floods, the post-disaster needs assessment (PDNA) team, NRA, and UXO Lao collected information by visiting the most flood-affected provinces of Attapeu, Khammuane, and Oudomxay to assess conditions and obtain direct insights into how other provinces may have been affected; by gathering reports from the field offices; and by reviewing related maps from the floods. Using the information gathered by the team, UNDP-UNOSAT produced a UXO heat map (that is, a map in which data values are represented as colors) based on existing UXO locations in Attapeu and the extent of flooding detected from time-series satellite imagery analysis, which was classified in terms of flood water (as opposed to permanent water) and flooding duration.[80]

80. The analysis is done through customized big data analysis on Google Earth Engine. The result is available as a web-based live map with a few functionalities, such as overlay, swipe, and compare, at https://unosat.maps.arcgis.com/apps/webappviewer/index.html?id=ffcafe663bd54c49b8d9ae349e169b3e.

Photo credit: UNICEF

Mitsamphan Secondary School Camp, Attepeu Province, Lao PDR.

DISASTER RECOVERY FRAMEWORK

WAY FORWARD: A DISASTER RECOVERY FRAMEWORK

To enable communities to recover from disasters in sustainable and resilient ways, recovery activities need to be aligned with the national and sector development plans as well as the overall Disaster Risk Management (DRM) agenda. Building on the results of the post-disaster needs assessment (PDNA), a disaster recovery framework (DRF) offers a full-fledged, government-led programmatic approach to guide and coordinate the medium- and long-term recovery efforts of official agencies, communities, and other relevant stakeholders. This chapter describes key elements of the framework for the recovery process in response to the 2018 floods.

The Guide to Developing Disaster Recovery Frameworks (2015)[81] sets out a number of steps and elements to guide to the preparation of a DRF[82]. As adapted for Lao PDR, the following steps were followed in preparing of the DRF for Lao PDR between September and December 2018, in line with timelines defined by the Government of Lao PDR for post-disaster needs and recovery planning:

- **November 2018:** PDNA results and draft DRF were presented to Government officials and development partners, and the National Disaster Prevention and Control Committee (NDPCC) met to endorse them.
- **December 2018:** A Pre-consultation for the 2018 Round Table Meeting was held, with the PDNA as the main topic. The PDNA results are submitted to the Government Cabinet for initial approval, followed by submission to the Standing Committee of the National Assembly for endorsement.
- **January 2019:** Launch of the DRF process.

This DRF comprises the following six components:

1. Recovery Vision and Strategic Objectives
2. Reference to Policy Framework
3. Institutional Framework
4. Sector Plans
5. Finance and Financial Management
6. Implementation Arrangements

1. RECOVERY VISION AND STRATEGIC OBJECTIVES

The overall recovery vision is to be approved at the highest levels of the Government of Lao PDR. The proposed vision is to *restore and improve access to basic social services and employment opportunities and improve resilience to floods and other natural hazards.*

In line with this vision, a set of strategic objectives will be defined by the respective Government agencies. These may be informed by the following principles:

- **Basic needs and continuity with humanitarian assistance and early recovery:** The immediate requirements need to be met to avoid secondary effects[83] that could complicate medium- to long-term recovery.

81. European Union, UNDP, the World Bank/Global Facility for Disaster Reduction and Recovery (GFDRR). Guide to Developing Disaster Recovery Frameworks. 2015. https://www.gfdrr.org/en/publication/guide-developing-disaster-recovery-frameworks.
82. hese steps include the government's decision to develop a DRF; identification of leading agency, partners; development of the terms of reference to define scope and schedule; orientation for sector teams; preparation of a draft DRF, including sector plans; consultation within sectors and validation; cross-sector prioritization; and finalization and submission of the DRF for validation by the government.
83. These include malnutrition, including of children and young adults, due to lower food supply; deprivation of the poor, especially women and other disadvantaged groups, in terms of health and education services; increased vulnerability of women, children, the elderly and persons with disabilities living in temporary shelters; temporary out migration of agricultural workers who have lost their livelihoods; higher levels of indebtedness of farmers; and more pervasive unemployment of workers in the informal sector.

- **"Building back better" (BBB) for resilient recovery:** BBB reduces disaster risks or at least does not replicate them. It considers issues such as geographical locations, enhancement of infrastructure, risk-informed planning, creating and/or enforcing zoning regulations, climate-smart agriculture, and crop diversification, and improvement of damaged infrastructure or service delivery systems.
- Minimal relocation: In the context of Unexploded Ordinance (UXO) contamination, the displacement of people and relocation of buildings should be kept to a minimum (see chapter on UXO).
- Comprehensive participation of stakeholders: The government, private sector, development partners, national non-profit associations and international NGO's, as well as social institutions can contribute to recovery actions. In Lao PDR, the government's round table mechanism and sectoral and sub-sectoral working groups provide an established platform for the recovery process.
- **Community participation and use of local knowledge and skills:** Communities are at the forefront of disasters and possess their own institutions, capacities, and local knowledge to deal with them on a regular basis (as noted in chapter on the DRM, environment and climate change).
- **Addressing the needs of social groups especially vulnerable to natural hazards:** Vulnerable groups include women (particularly of reproductive age), young children, and the elderly (as noted in the human development Impacts chapter).
- **Strengthening the country's capacity in DRM:** The strengthening of DRM capacity must be based on existing institutions at government and community levels to ensure vulnerability to natural hazards is reduced and the scale and impact of future disasters minimized by scaling up resilient approaches in critical sectors and high-risk areas.

From the outset of objective setting, the government should pursue consultations with internal and external stakeholders as mentioned above, to continue communication and obtain inputs, as well as to confirm consensus to facilitate coherent planning, obtain support and buy-in, and guide the expectations of the various groups of stakeholders.

2. POLICY FRAMEWORK

A recovery policy framework supports the financing and implementation of the recovery process. This begins with aligning the DRF with the Government's strategic goals, such as graduating from least developed country status, reaching the Sustainable Development Goals, reducing poverty, and achieving objectives set through the national development planning cycle, as well as relevant plans and strategies including the 8th National Socio-Economic Development Plan (NSEDP), the National Growth and Poverty Eradication Strategy, and sectoral strategies. The mid-term review of the 8th NSEDP provides an opportunity for the DRF to support existing development plans and further integrate Disaster Risk Management into it. Engaged stakeholders should align their actions with government policies and objectives. Engaging them in a dialogue led by the Government allows them to contribute more substantially and coherently to the overall recovery process.

The Government of Lao PDR is in the process of drafting a Disaster Prevention and Control Law, as well as a Climate Change Decree. Both legal instruments should account for the key lessons learned from the 2018 floods and address relevant aspects of DRM, especially in the context of institutional roles, communication and overall coordination, as well as capacity needs to ensure their implementation.

The next step in developing the DRF policy framework is translating strategic objectives into specific policy elements. Recommended elements include, but are not limited to, the following:

- **Owner-driven reconstruction of housing and non-engineered structures:** Building on family and community institutions and knowledge, the government can provide financial and technical assistance, while developing and ensuring compliance with standards (such as building codes) that increase resilience to natural hazards.

- **Support for community, volunteers, and private sector engagement:** Engagement should be supported by functional and successful mechanisms, such as community development funds.
- **Land use policy and relocation:** A land use policy for reconstruction will make it possible to locate and/or organize reconstruction efforts in a manner that minimizes exposure and vulnerability to floods and other natural hazards. Relocation should be kept to a minimum, to ensure continuity of community life, livelihoods, and cultural practices, as well as to avoid UXO risks.
- **Balance among infrastructure, productive and social sectors:** Support for sectors such as health, education, and water and sanitation is critical for ensuring basic needs are met. Inputs for agriculture are needed to address the shock communities are recovering from, and to prevent decline in incomes and increase in debt levels in the next season. Restoring accessibility to infrastructure and services is essential for economic recovery.
- **Opportunities for vulnerable groups**: Cash transfers and labor-intensive public works programs can not only help restore much-needed income sources, but also build skills for the future, prioritizing specific groups. Public works program could address the needs of populations that suffered heavy losses.
- **Integration of DRM and BBB principles:** Recovery should address multiple hazards and provide multiple benefits[84], utilize local materials to reduce cost and save time, and provide training in skills and employment to improve livelihoods and local capacity.

3. INSTITUTIONAL FRAMEWORK AND SECTOR PLANS

Institutional arrangements should allow the Government to lead recovery in a way that maximizes the effectiveness of all stakeholder efforts. This can be achieved by clearly delineation of mandates and responsibilities, structures and functions, and capacity building for recovery. It is recommended that existing organizations and mechanisms for coordination, particularly those related to DRM, be utilized in this process. Coordination and harmonization of the government and development stakeholders' activities are vital for DRF implementation. At the national level, the following arrangements-some already in place- are proposed:

- NPCC serves as the top-level coordination body with overall responsibility for DRF implementation.
- The Ministry of Planning and Investment (MPI), which is mandated with development planning, was assigned as the lead agency for recovery, reporting to NDPCC on the implementation of the DRF.
- The Ministry of Labour and Social Welfare (MLSW), which holds the overall mandate for DRM, will coordinate with and support MPI in developing and implementing the recovery action plan, in partnership with relevant line ministries. The recovery action plan is to be prepared at the sector level. Support provided by MLSW to MPI will be important to ensuring continuity from emergency to recovery phases, as well as in mainstreaming DRM into sector plans.
- The Ministry of Finance and other line ministries, as members of NDPCC, will provide inputs according to their mandates and sectors.

84. Although floods are the most frequent and severe disaster in Lao PDR, the country also is susceptible to drought, landslides, and particularly in northern provinces) seismic risk. While focusing on flood recovery, the DRF should address as many natural hazards as possible, or at least avoid mitigating one risk and exacerbating another. Existing risk assessments should be synthesized and utilized for this purpose.

- The existing roundtable mechanism with its 10 sector working groups and 30 sub-sector working groups, will support the coordination of government and development partners around the recovery. Given the multitude of Working Groups and agencies involved, there should be focal points for recovery within the Workings Groups most essential to the recovery.
- For the private sector, it is recommended that the Chamber of Commerce be engaged by MPI.

At the sub-national level, the existing Provincial and District Disaster Committees already include various sectors, with MLSW as the focal point for response. Similarly, the provincial and district levels of MPI would lead at the local levels, with the committees at the provincial level reporting to MPI concerning recovery. If necessary, a dedicated implementation unit might be considered for the hardest hit, most disaster-prone provinces.

The recovery should develop existing capacities and utilize DRM programs to help institutionalize capacities within the government, private sector, and communities, which carry out much of the ground work for recovery. Informed by the existing capacity assessments and gaps identified in the PDNA, a consultation and training for MPI, MLSW, and line ministry focal points on risk-informed recovery development should be undertaken immediately and subsequently sustained by a DRM program. Such training should include not only planning and investment, but also specialized functions in procurement, evaluation of tenders, and oversight of projects at all levels. After this is undertaken, a full-fledged DRM capacity assessment should be executed and applied to target capacity gaps better and adjust the training.

Sector plans will be used to guide, plan, and estimate resource requirements for recovery and full integration of reconstruction activities into the overall development plan of the government, as outlined in the 8th NSEDP. Sector plans will be prepared under the leadership of the respective line ministries and with the support of relevant development partners in accordance with the proposed institutional framework.

The first step in sectoral planning is to identify priority sectors for recovery, proceeding from the PDNA results and other available assessments (humanitarian, sector-specific, and so on.). Inter-sectoral prioritization permits the formulation of mutually reinforcing recovery actions and helps eliminate duplications and gaps. The 2018 PDNA indicates that the sectors sustaining the greatest damage and losses were in production (agriculture, including crops and irrigation, at 1,227 billion Lao kip) and infrastructure (transport and waterways at 1,608 billion Lao kip and 117 billion Lao kip, respectively). As the PDNA methodology and timelines do not allow for a quantification of damage and losses across all sectors, the MPI should consider the needs summarized in Table 62 below in the prioritization-process. Aside from overall quantified impact per the PDNA, key criteria include the following:

- **Potential for direct and widest humanitarian impact:** As in many other countries, sectors with direct humanitarian impact in Lao PDR include housing and livelihoods, and activities related to rebuilding of critical infrastructure and restoration of public services. The PDNA also notes impact in the commerce and industry, tourism and culture sectors, which contribute to people's livelihoods as well as Lao PDR's economy.
- **Ability to reduce poverty:** Disasters have considerable implications for poverty reduction, as noted in the National Growth and Poverty Eradication Strategy.[85]
- **Effectiveness in addressing the needs of especially vulnerable social groups.** As noted above.
- **Value chain analysis:** This applies to all sectors but is most crucial for agriculture, in which 70 percent of the population is employed.
- **Ability to strengthen Disaster Risk Management:** While focusing on recovery, preparedness and mitigation of multiple natural hazards[86] is an important consideration.

85. The NGPES highlights the impacts of disasters, particularly floods, in the southern portion of the country, as well as vulnerabilities to floods and drought in the agriculture sector, and the environment sector (such as mismanagement of natural resources, deforestation, and soil erosion and degradation).

86. In lao PDR, for example, per the available risk assessments, livelihoods issues, education, and health are among the sectors most affected by earthquakes, while agriculture remains highly vulnerable to drought. See also previous footnote.

- **Climate change and environment:** While needs in these sectors (such as the need for ecosystem services) can be difficult to quantify, poor management of natural resources, deforestation, and soil erosion and degradation considerably increase vulnerability to disasters. In the context of climate change, climate-resilient development and improving adaptability to changing conditions is vital.

Given that the 2018 floods affected all provinces of Lao PDR, sector plans must carefully target specific geographical areas. Overall, the 2018 floods caused the greatest quantifiable damage and losses in Vientiane Capital, Huaphanh, Khammuane and Attapeu provinces, while in terms of per capita impact, Attapeu and Huaphanh were the most affected. The different types of flood events and a high variance in the social, economic and environmental conditions of the provinces and districts necessitate a substantially differentiated approach to recovery in specific areas. Moreover, proceeding from a multi-hazard approach (using available risk assessments), sector plans should target both the areas affected by the 2018 events and those historically at a high risk of disasters.

As the policy and strategy framework and institutional arrangements are translated into sector-specific plans, respective line ministries should further identify the priorities for recovery under their mandates. These should be time-bound to indicate priorities in the short, medium and long terms. The aggregate needs identified in the PDNA will be broken down into specific projects and activities with funding requirements over the given time frames with corresponding levels of urgency. Breaking down the aggregate needs into individual activities or projects will help with the following:

- **Determining which among the identified needs are most urgent.** The Government (through MPI and MLSW) should evaluate and prioritize the needs of various ministries in line with the criteria listed above.
- **Enabling the Government to analyze the potential socio-economic impacts.** The additional costs of recovery over time and their impacts on socio-economic targets of the 8th NSEDP (such as public expenditure, GDP, budget deficits, tax revenues, balance of payments, and the overall public debt management as well as poverty, welfare, employment, incomes and other social indicators) can be analyzed if aggregate needs are broken down into specific activities.

Sector plans can be developed into tools to monitor and evaluate progress against set targets on a regular basis. These plans are meant to be living documents, to be updated periodically based on the targets and indicators, as well as on the possibility that needs may change over the long term.

Table 62 — Sectoral Needs Identified in Lao PDR 2018 PDNA

PRODUCTIVE SECTODR	INFRASTRUCTURE SECTOR

1. Agriculture
• Provision of seeds and fertilizer to flood-affected farmers
  • Very urgent for 2018/19 winter (dry season) crop
  • Also necessary by May 2019 for next summer (wet season) crop
• Replacement of dead livestock and fish fingerlings
• Disaster-resilient rebuilding of irrigation infrastructure damaged by the disaster
• Consider implementation of climate-smart agricultural practices for the long term
• Replantation/Reforestation
 	
2. Industry and Commerce
• Increase in insurance coverage to manage risk better
• Facilitation of electricity and water supply availability, particularly to small- and medium-sized enterprises (SMEs) in the manufacturing sub-sector
• Provision of greater access to reinvestment financing
• Capacity building in supply chain management
• Tourism
• Repair/reconstruction of damaged community-based tourism operations
• Repair/reconstruction of damaged accommodations and restaurants
• Recovery of the Xe Pa and Xe Bonglay waterfalls, including development of a crafts market
• Repair/reconstruction of damaged tourism sites and other tourism facilities
• Organizing of marketing campaigns to build confidence in tourism sector
	1. Transport
	• Emergency repair of the damaged roads and bridges
	• Spot improvements for damaged roads,
	• Implementation of climate-resilient road improvements
	
	2. Electricity
	• Repair of distribution grids
	• Installation of slope protection, sag reduction of conductor, repair of tower foundation for transmission lines and substations
	• Preparation of spare parts for distribution grids
	• Reconstruction of transmission tower, including restringing of conductor, if necessary
	
	3. Water supply and sanitation
	• Restoration of water supply services and reconstruction / replacement of temporarily repaired components
	• Water points disinfection, including distribution of field test kits and WASH emergency pre-positioning
	• Rehabilitation/repair of water supply systems and family latrines, including hygiene promotion (behavior change)
	• Capacity building for DRM for flood-prone villages
	
	4. Waterways
	• Engineering survey and design for recovery projects.
	• Mainstreaming embankment recovery for Vientiane C. Mekong
	• Mainstreaming bank erosion recovery for Khammouane Mekong
	• Mainstreaming structure recovery for Xayabury Mekong
	• River dike construction for Luangprabang Nam Khan
	• Riverbank protection

Photo credit: Sengdoun Thongsavath.

Damaged Kuti at Vat Ban Mai, Sanamxay District, Attapeu Province.

SOCIAL SECTOR	CROSSCUTTING
1. Housing and settlements • Rapid assessment of low-lying/disaster prone areas • Capacity building based on "build back better" principles • Housing rehabilitation and reconstruction **2. Health** • Application of "build back better" principles for the reconstruction of health facilities • Increase in support to health staff in the affected areas for improved prevention of malnutrition and good nutritional practices in the affected population • Increase in disease prevention and control preparedness, inclusive of support for outbreak investigation and response **3. Education** • Improvement of learning facilities for children • Provision of learning materials and equipment • Creation an enabling environment in schools • Strengthening of DRM system in the education sector and providing training and capacity building to make schools safer places for learning • Enhancement of knowledge and skills on DRM among students and the public to create a culture of safety **4. Culture** • Repair of prioritized temples in Attapeu • Provision of emergency repair and stabilization of other damaged cultural properties (temples, stupas, sacred caves, etc.) • Repair of damaged infrastructure of Luang Prabang World Heritage site • Provision of technical support for damaged collections, especially temple collections (manuscripts, statues, etc.) • Provision of financial and technical support for documenting and developing strategies to safeguard intangible cultural heritage in Attapeu, especially for the Oy ethnic group • Provision of financial support for recovery of local cultural industries • Ensuring that other recovery measures in other sectors (especially housing) are appropriate to local culture and traditions	**1. Disaster Risk Management, environment and climate change** • Strengthening of DRM legal and regulatory framework and institutions • Capacitation of EOC/MLSW to develop an effective Incident Command System from national to community levels • Risk-informed development planning, budgeting, and financing to strengthen resilience of critical, high-risk sectors • Development of emergency standard operating procedures for dams and end-to-end early warning system for downstream, and high-risk areas • Preparation for coordinated recovery • Provision of water-level monitoring equipment at Oudomxay, Bolikhamxay, Khammuane, Savannakhet **2.Governance** • Conducting of administrative mapping • Re-issuance of important documents • Connection of people to needed information • Provision of legal aid and justice advice **3. Human Development** • Provision of child protection services to displaced children, focusing on children without adequate parental care in Attapeu to address their needs for psychosocial support. • Provision of support for Lao Women's Union (as the key agency) to coordinate with sectors to prevent and respond to gender-based violence (GBV) through trainings and make GBV services available to survivors and women and girls at risk in Attapeu and other provinces via women-friendly spaces and awareness • Ensuring that the disaster response strategy is gender responsive and addresses gender and intersectionality concerns • Ensuring that the disaster response strategy includes all persons with disabilities through a social protection scheme component for the elderly and disabled so they are not left behind **4.UXO** • Conducting of targeted survey in high-risk areas • Provision of risk education and awareness • Conducting of clearance operations as needed

Note: DRM = Disaster Risk Management; GBV = Gender-based Violence; MLSW = Ministry of Labour and Social Welfare.

4. FINANCES AND FINANCIAL MANAGEMENT

A financing strategy is needed to manage financing of the DRF, covering the government's major finance-related responsibilities in recovery, including the following:

- Estimating the cost of recovery
- Identifying and mobilizing financial resources for recovery
- Developing and approving recovery budgets
- Setting up administrative arrangements to disburse funds and track and report on expenditures and results

The PDNA provided cost estimates for the needs required for recovery, based on sectoral assessments conducted, totalling about 4,422.86 billion Lao kip or US$520 million. Financing recovery will require various sources such as the following:

- **National budgetary allocations**: Annual budget allocations at the national and provincial levels, as well as by sectors should consider specific consideration of climate resilience, risk reduction, and disaster preparedness. In the Philippines up to 1.8 percent, and in Indonesia up to 1 percent of national budget is earmarked as contingency funds. Other fiscal tools, such as subsidies for certain types of reconstruction (such as housing) or tax breaks for disaster victims, can be considered.
- **Development support/official development aid:** Sectors engaged in activities with development partners can consider re-channeling funding into the recovery efforts.
- **Private sector:** In line with a national disaster risk financing and insurance strategy, specific mechanisms could be introduced and strengthened, such as micro-insurance for disasters and agricultural insurance. The private sector can also contribute to improved preparedness, for example, telecommunications companies can support communication of early warning messages through various means – and can could support the reconstruction of basic infrastructure.
- **Livelihoods and income generation:** Tax exemption could be introduced for businesses affected by the disaster. Cash transfers and labor-intensive public works programs can help restore much needed income sources, as well as carry out public works.
- **National Disaster Fund:** Currently, there are provisions in the State Budget Law for budget allocation to the State Reserve Fund and National Contingency Fund which are triggered in disasters. A national disaster fund or trust fund mechanism could be established with a resource mobilization strategy to capitalize this fund from sources other than the national budget.

The disaggregation of priority needs into specific projects or activities will help determine the levels of additional budget needed annually to implement recovery activities. Line ministries, with support from the Ministry of Finance, should identify funding sources for their sectors and forecast funding requirements by year. Some funding may be earmarked for specific purposes, regions or sectors. Sector requirements may be estimated by identifying specific projects, but these projects must be aggregated into programs to help Lao PDR ultimately to meet the objectives set by the 8th NSEDP. Financing strategies will vary from sector to sector and level of government (national, provincial, district, and village). Certain sectors will primarily depend on government funding alone, while others can also mobilize alternative funding sources such as development cooperation, assistance from the private sector, or public-private partnerships. Remittances and bank loans, for example, can help relaunch economic activities in tourism and agriculture.

The final component of the financing strategy is to establish administrative arrangements to disburse funds. Government procurement guidelines and the financial management system should be applied, including with regard to financial reporting, arrangement of audits, and accounting procedures. These may need to be adjusted for flow of approval and payment by project type, such as housing assistance, infrastructure, and agriculture. Systems must be strengthened to track and report on expenditures and results.

5. IMPLEMENTATION ARRANGEMENTS

The DRF will be implemented under the overall leadership of MPI and direction of sectoral implementation will be under the respective line ministries. For hard-hit and/or high-priority sectors, dedicated regional or project implementation units may be a need to be established. The location- and hazard-specific nature of the 2018 floods requires careful design of local implementation arrangements, from province level to the villages. At all levels, coordination will be vital.

To fast-track the rehabilitation and recovery process, adjustments may be needed in overall management, including project development, procurement and implementation. The recovery plan should have built-in processes and procedures that can expedite the implementation of urgent repairs and reconstruction of productive assets and the restoration of livelihoods, including existing rules and regulations (funds flow, procurement, auditing, monitoring and evaluation, and so on.) appropriate to fast-track implementation. International experience is available in fast-tracking such processes.

International experience shows that transparency leads to better outcomes. Monitoring, evaluation, and enforcement systems need to be set up to track progress and adjust the process as needed, in such a way that the results can be used for evidenced-based implementation of the overall recovery process. The results framework in support of monitoring and evaluation should include SMART[87] indicators for the monitoring on-/off-budget financial commitments and resource mobilization; projects, budgets, financial, and physical progress of actions; and economic and social impacts.

Milestones should be established for progress, linked to funds disbursement. For community support, beneficiary selection and a tracking system are needed, with public participation. Evaluation of outcomes and results should be conducted by an independent third-party and/or through annual audit with a full midterm evaluation to monitor impact. The DRF should be updated and reiterated regularly based on the results produced through the monitoring and evaluation system and/or in accordance with changes in needs and circumstances, such as another disaster.

Strategic communication is important to convey the DRF's objectives, responsibilities, and timeline to the public and private sectors, to inform the affected areas and partners concerning progress and access to support, and to help mobilize the support and cooperation and collaboration of communities, civil society, and donors, as well as to obtain vital off-budget resources. For internal communication, an information management system with information and communication procedures is essential to process and verify information and to ensure effective coordination. External communication requires messaging targeted to various sectors and social groups, and appropriate media. A communications and outreach plan, informed by recovery priorities and feedback and risk perception surveys, can help inform this messaging. The plan should specify priorities and procedures for media relations. For messaging to specific audiences, selection of appropriate media is crucial; these may include the use of written materials, news outlets, websites, social media and/or mobile telephones as well as radio and loudspeaker systems for rural areas.

87. SMART = specific, measurable, achievable, relevant, and time-bound.

ANNEX 1 — MAP OF LAO PDR

Photo credit: UNFPA

Affected houses in Sanamxay, Attapeu, August-September 2018.

POST-DISASTER NEEDS ASSESSMENT

2018 FLOODS, LAO PDR

UN in Lao PDR

THE WORLD BANK
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GFDRR
Global Facility for Disaster Reduction and Recovery

European Union