



Policy Recommendations: Impact of Climate Change Programs in Cambodia: Vulnerability, Poverty, and Gender

Strategic Program for Climate Resilience (SPCR) The Five-Year Mekong River Island Connectivity Project (2016–2020), Kampong Cham and Tboung Khmum Provinces

Design more resilient roads and maximise their socioeconomic benefits by incorporating local knowledge, considering long-term needs and improving integration of vulnerable groups

To address the vulnerability to floods of five Mekong islands in Kampong Cham and Tboung Khmum provinces, the Ministry of Rural Development (MRD) implemented the Strategic Program for Climate Resilience (SPCR) – The Five-Year Mekong River Island Connectivity Project (2016–2020) in Kampong Cham and Tboung Khmum provinces. This program involved the construction of concrete roads, installation of solar-powered irrigation pumps, restoration of farm ponds, provision of latrines, and diversification of income sources. Figures 1 and 2 show the locations of the project sites and a new concrete road.

The road project has had a clear impact on the lives of the target beneficiaries. It contributed to increases in household income, broader income-generation opportunities, and better access to public services including health and education. This policy brief draws on the findings of a three-year research study to determine which planned project benefits have been achieved

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and to recommend follow-up action to improve similar programs in the future.

Key messages

- All segments of the local population have benefitted from the concrete roads and jetties built under the project. Beneficiaries mentioned increased household income; convenient and easier travelling for everyone but especially for children, with the road being more resilient to floods; and quicker and safer travel to hospital, particularly for pregnant women and the elderly.
- Inappropriate road size, lack of traffic signs, and the large number of heavy trucks using the road daily are the main shortcomings.

Figure 1: Map of Mekong Islands in Kampong Cham and Tboung Khmum provinces

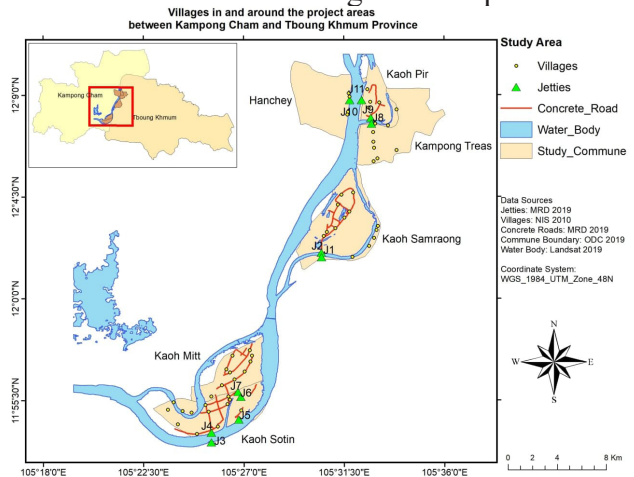


Figure 2: The concrete road in Koh Meunnong village, Kaoh Pir commune, Kampong Cham province



- Similar programs are recommended, but with measures to ensure 1) road widening (to 5–6 m) to fully take into account induced traffic, which is increasing faster than estimated, 2) effective traffic signage for better road safety, 3) and improved control of overloaded trucks to reduce costly road surface damage.
- A monitoring and maintenance team should be established to keep roads trouble free and prolong their lifespan.
- Different vulnerable groups need different types of support to maximise the benefits of road projects. Future programs should improve the engagement of vulnerable groups before, during and after implementation. Poor and landless households, in particular, require specific forms of support to ensure they can fully benefit from climate change adaptation initiatives.

Positive impacts

All segments of the population, including vulnerable and marginalised groups (female-headed households, women, the elderly, children, and people with disabilities), have benefitted from road concreting. Higher household income, more tourists visiting the islands, increased agricultural sales, and better access to important places such as school, market, hospital, pagoda and farm were the main benefits reported.

Beneficiary households had a strong perception of livelihood change through higher household income (Figure 3). Around 60 percent of female-headed households, poor and general households claimed that their household income increased after the intervention. The program had a positive spillover effect for non-beneficiary households, who also experienced an increase in household income.

Table 1: Average annual income of beneficiary and non-beneficiary households in 2019, 2020 and 2021

Average annual household income (USD)				
	2019	2020	2021	Impact (DID) 2019–21
Beneficiaries	1613.83	5303.13	2597.91	-
Non-beneficiaries	1618.76	3602.66	2260.36	-
Difference	-4.92	1700.46	337.54	342.47

Source: Survey 2019, 2020 and 2021

In 2019, before project implementation, the average annual income of beneficiary households was USD1,613 and that of non-beneficiary households was USD1,618 (Table

Figure 3: Degree to which beneficiary and non-beneficiary households experienced income gain or loss due to the climate change program (N = 205)

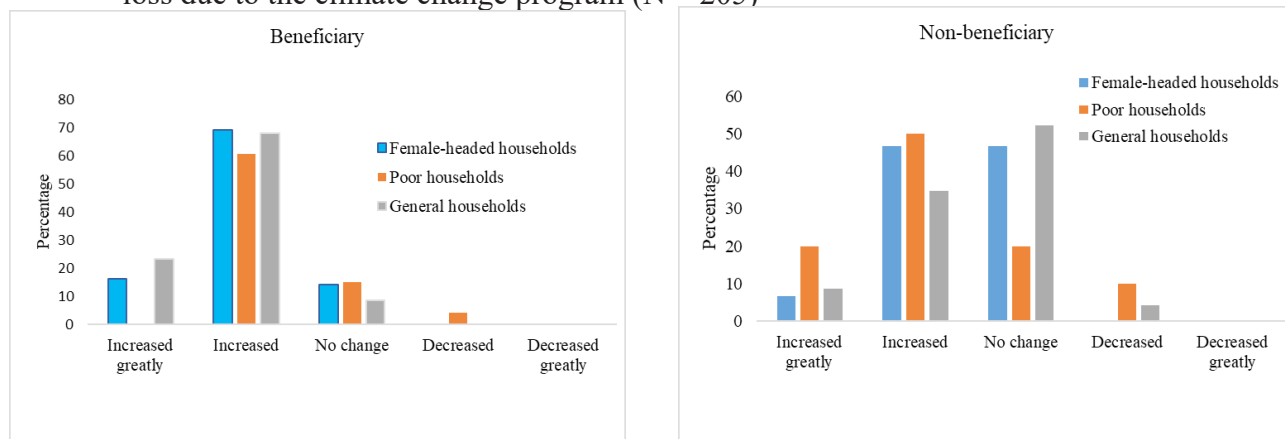
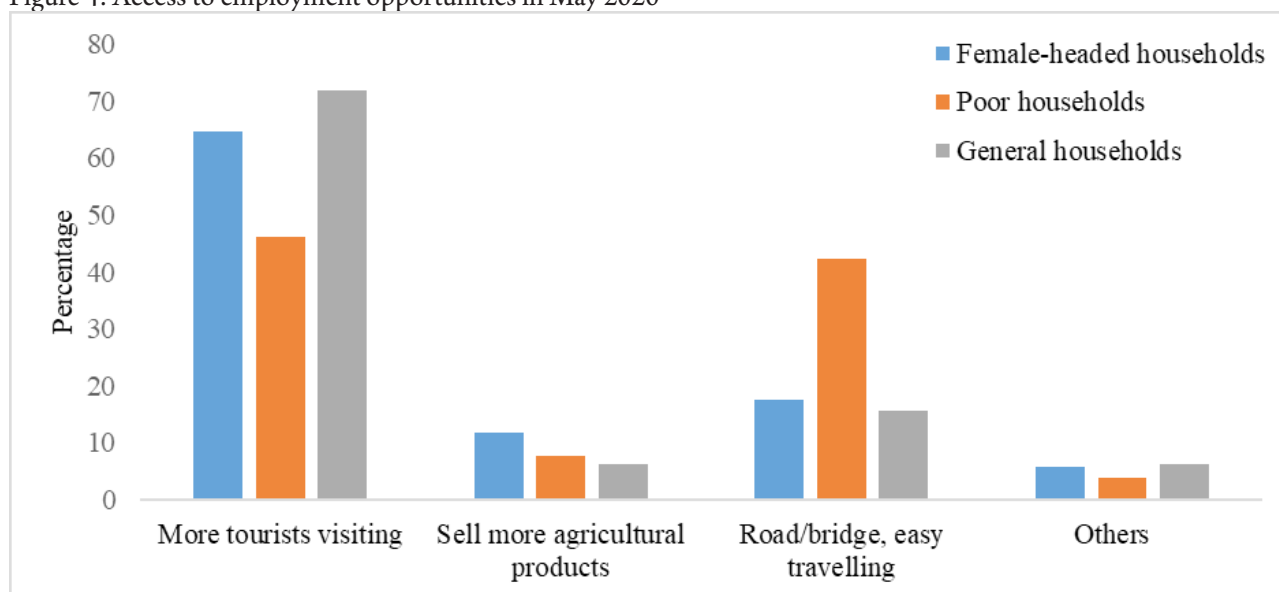


Figure 4: Access to employment opportunities in May 2020



1). In 2020, after the intervention, average annual household incomes stood at USD5,303 and USD3,602, respectively, then in 2021 dropped to USD2,597 and USD2,260. The difference-in-difference between 2019 and 2021 is USD342, which means households served by concrete roads have a higher annual income than those who are not.

Road concreting also had a positive impact on access to employment. High percentages of beneficiary household groups gained more access to employment in the tourism

sector (female-headed households 64 percent and general households 71 percent) in 2020 (Figure 4). The project also helped to improve agricultural transport, evidenced by increased agricultural sales as reported by 11.76 percent of female-headed, 7.69 percent of poor and 6.25 percent of general households. Overall, beneficiaries perceived access to roads and ease of travel to be the main benefits of the project.

Findings from the qualitative research highlighted various benefits of the project. Ease of travel was frequently mentioned:

Table 2: How the concrete road has benefitted vulnerable people

Vulnerable groups	Benefits from road concreting under MRD's Strategic Program for Climate Resilience
Female-headed households	Women can travel more easily by motorbike without worrying about skidding or falling over because the road is not slippery like before; open a convenience store in front of their home, with more people coming to buy their wares; and reach the hospital faster for a health check, treatment or childbirth.
Elderly	Older people find it easier and more convenient to reach the pagoda, go to market and access the commune council.
Children	Children can walk to school easily without the risk of falling over on muddy slippery roads. Their journey to school is safer and quicker.
People with disabilities	They can travel and transport goods more easily and safely, even when it is raining, because the road no longer gets muddy and slippery. Travel to the hospital is more convenient. More people from outside the area are coming to buy agricultural products, increasing their incomes.
Poor households	They can travel to work and other places more conveniently and safely as they no longer have to contend with muddy and slippery road conditions. They have limited assets and so have fewer opportunities to engage in business and fully benefit from the road for income generation.

The benefits for different groups of people include easier travelling for general people, easier travelling to school for children, and quicker travel to hospital for [pregnant] women. (Male key informant, Koh Soutin)

The benefits of a climate-resilient road network are particularly salient in the rainy season in that it helps minimise disruptions in market access and supply chains. Road concreting also increased the price of land in adjacent areas:

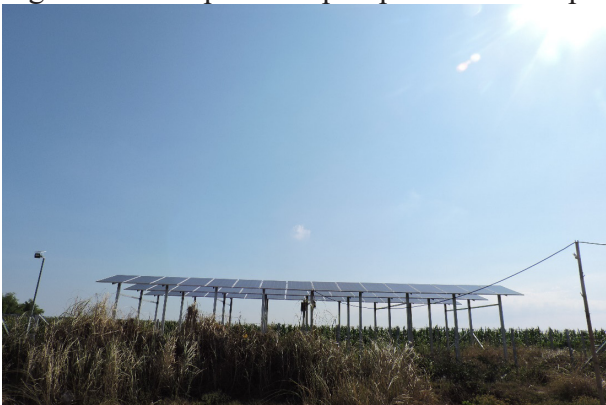
With the concrete road, it is much easier to travel – no mud when it’s raining. And it’s beneficial for selling goods, for even when it’s raining, people can still come to buy. The price of land in the village has also risen since the road was built. (FGD, females only).

Importantly, as summarised in Table 2, all the vulnerable groups have benefitted from the road infrastructure project.

Best practices

Building concrete roads in rural Cambodia is a good investment as they deliver the benefits described above for a cost per square metre of around USD100 to USD125. That buys roads designed and built to last longer than conventional red soil roads, which are susceptible to heavy rain, standing water and heavily loaded trucks. Other good investments are solar-powered pumps for irrigation, pond restoration for dry season irrigation (Figure 5) and latrine provision, as well as grants for micro businesses (to strengthen the local economy and increase household income).

Figure 5: Solar-powered pump and restored pond



Four policy recommendations and further actions needed for improving climate adaptation project outcomes

1. Make the project design process more inclusive

- Understanding about the aims of the project among villagers in the targeted areas was limited. This meant the majority of villagers, apart from those in administrative positions, had no clear information about the project or the road developers.
 - Action:
 - Increase program awareness through face-to-face consultation with communities. The village meetings organised by village chiefs would be a useful channel for building awareness of project developments in the target areas.
- Gender considerations have been integrated into the design of infrastructure development projects, but the specific needs of other marginalised groups such as people with disabilities and the elderly have not.
 - Actions:
 - Integrate the needs of marginalised groups into the program during the design stage to make sure that the benefits will reach them. Infrastructure should be built with consideration for the elderly and people with disabilities.
 - Hold focus group discussions with different groups to ensure all voices are heard.
- Some parts of the concrete roads, specifically in Koh Dach village of Koh Mit commune, are still susceptible to flooding. This can be remedied through more in-depth



consultations with villagers and village chiefs. The old and lower roads can be raised based on local knowledge to prevent flooding. New roads are susceptible to sediment-related damage as a result of soil erosion caused by rainwater runoff.

◦ Actions:

- Hold extensive in-depth consultations with villagers and village chiefs in all project sites to learn about local geographical and biophysical conditions, and human and cultural factors, to ensure that new roads meet the needs of local people.
- Plant trees along the newly built roads in all villages to provide shade for road users and prevent soil erosion from rain runoff.
- Monitoring and control of quality and workmanship during the construction phase is crucial to ensure that concrete roads and jetties are built properly to the required standard. Even though past flood levels and climate change impacts were taken into account during the design phase, some jetties have already suffered damage because the concrete, construction and design cannot withstand the strong undercurrent of the Mekong River. The project documents mention that construction of the concrete road was costly but it was considered resilient to 100-year floods.

◦ Actions:

- Open the procurement process to international bidders to achieve competitive prices and better quality.
- Build a quality control and monitoring system, authorised and led by a committee comprising village chiefs, commune chiefs and provincial MRD staff.

2. Address different aspects in the implementation stage

- The road is considered too narrow by some villagers and they hope it can be widened: “I would like to request a wider concrete road, of between 5 and 6 metres” (KII, male villager). The lack of traffic signs also attracted criticism. Poor road signage leads to traffic chaos and higher risk of traffic

accidents. A large number of heavy and often overloaded trucks use the road daily: “Many big trucks loaded with kapok trees drive through the commune, which has provoked many conflicts with the authorities” (KII, Koh Samrong Commune Council). It is a concern because heavy trucks could damage the quality and shorten the lifespan of the new road.

◦ Actions:

- Construct more concrete roads on other parts of the Mekong Islands and on other islands in Cambodia.
- Consider expanding the width of new/upgraded village roads to 5 or 6 m and installing solar-powered road lights. Main roads of this width are being built, but the villagers would like village roads to be this size as well.
- Speed up the installation of traffic signs, which together with improving awareness of traffic law and accident prevention can reduce road safety risks.
- Establish rules and regulations for using the road, the types of trucks allowed and the loads (type and weight) those trucks are allowed to carry. The 10 different truck categories determined by the MRD for this project could be implemented quite soon, depending on how quickly related training can be organised.

3. Continue supporting the project through the post-implementation stage

- Maintenance of the built infrastructure is crucial for sustaining project outcomes.

◦ Actions:

- Set up a maintenance team comprised of local community members, with local MRD staff in charge of maintaining road quality.
- Encourage villagers/drivers to abide by road rules and regulations, and penalise drivers and road users who break them.
- Provide training for community leaders and villagers on leadership, motivation, participation, and ownership of the built infrastructure.
- Water shortages are common in the dry season, affecting cash crops and fruit trees

particularly tobacco, sesame, corn and pomelo.

◦ Actions:

- Install solar-powered pumps because they are a cost-effective and convenient way to electrify irrigation, and organise technical training for project beneficiaries on how to use, maintain and repair them.
- Restore more farm ponds on the islands to store water for use in the dry season.
- Plant trees and grasses to stabilise the banks of the restored ponds and prevent them silting up due to soil erosion.

4. Improve project outcomes for vulnerable groups

- Vulnerable groups, particularly the elderly and people with disabilities, are often neglected. However, the elderly population is expected to increase in the next 10 years. Most of the survey respondents were in their 50s or 60s and were taking care of their grandchildren while the parents were away working in the cities.

◦ Actions:

- For vulnerable people: establish village or commune associations for the elderly and offer social security/cash transfers to support pregnant women, the elderly and people with disabilities.
- For female-headed households: provide effective employment support for women, subsidise piped water supply, and provide training on farming and entrepreneurship and how to cope with floods.
- For the elderly: improve healthcare centres and access to healthcare services, provide monthly financial support, and provide training on how to cope with floods.
- For children: provide latrines and clean water supply, hygiene and sanitation programs, and higher education scholarships for universities in Phnom Penh.
- For people with disabilities: provide mobility aids, monthly financial

support, skills development programs, and training on how to cope with floods.

- For poor households: provide a plot of farmland, skills development programs, job opportunities, and grants to start a business. Poor households have few assets to invest in a business, so job opportunities could be a practical way for them to benefit from the program.

- During the flood season, villagers suffer many hardships in terms of food supply, health, and medical assistance.

◦ Actions:

- Increase the number of emergency boats serving the river islands in Kampong Cham province during the flood season.
- Seek food and medical assistance from charities and the Red Cross.

- River bank collapse is a serious problem in Village 9 and Village 12, forcing people to move home and destroying farmland. River landslides are difficult to predict, so it is almost impossible to forecast which areas might be affected.

◦ Action:

- Put in place emergency assistance and financial and in-kind supports to help affected households relocate to safer places and farmland in nearby villages.

- Local livelihoods, especially women's livelihoods, have been severely affected by Covid-19. The price of the tobacco they grow dropped to only 10,000 riels/kg,¹ while the prices of food items such as fish, pork, rice and corn increased (female respondent, FGD).

◦ Actions:

- Provide monthly cash transfers via mobile to support households whose livelihoods have been severely disrupted by Covid-19.
- Provide e-commerce training for local communities on buying and selling online as a means of supporting the local economy post Covid-19.

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1 Before Covid-19 hit, the tobacco price was 14,000 riels per kg.

Climate Proofing Integrated Rural Community Development in Kampong Svay District, Kampong Thom Province

Improve climate change programs by expanding the number of beneficiaries, setting up a monitoring system, and making project delivery inclusive

- The climate adaptation program called “Climate Proofing Integrated Rural Community Development in Kampong Svay District, Kampong Thom Province” includes the provision of climate-resilient wells, home gardens, latrines, water storage, access to sanitation, and resilient livelihoods. It has benefited the beneficiaries a great deal. The home gardens allow locals including women to grow vegetables for consumption and for extra income. The climate-resilient latrines provide safe, convenient and sustainable sanitation and improve the quality of life. The beneficiaries also enjoy ready access to clean water from the wells provided. Figure 6 shows the location of the studied villages and figures 7 to 10 provide a snapshot of project activities.

Key messages

- Beneficiaries benefit from the program in different ways. The home gardens benefit women the most as they provide both vegetables for consumption and a potential source of household income. The wells help villagers to save money as they no longer have to buy water. The latrines improve hygiene and health for all, especially children.
- More support is needed for maintaining and repairing those facilities as villagers do not always have enough resources to do so themselves.
- Monitoring and support systems should continue after the implementation stage.
- It would be beneficial if future projects could provide more wells, home gardens, latrines and water storage tanks for a larger number of carefully selected beneficiaries.
- Awareness-raising for the beneficiaries and local authorities on ownership of the project outputs is recommended.
- Different vulnerable groups need different support. Future programs need to take that into account.

Figure 6: Map of the studied villages in Kampong Svay district, Kampong Thom province

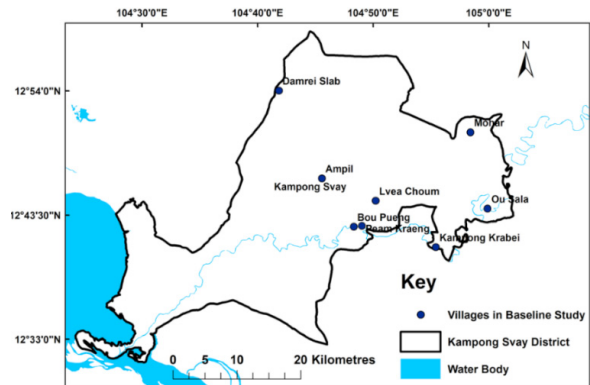


Figure 7: Deep drilled well for year-round water supply



Figure 8: Water pump for year-round water supply



Figure 9: Flood-resilient latrine and rainwater collection/storage system for improved sanitation



This well is the new hope in this village. We can get enough water for consumption now. We are very fortunate to have a very good water source. This water can be used for drinking, cooking and gardening. (KII in Slaeng village)

More importantly, the wells help the villagers save money on buying water:

The well helps us save money. Before, we had to buy drinking water. Now, we no longer need to do that. (KII in Bopeung village)

The cost of one cement jar of water is 5,000 riels. It may not sound like a lot, but for these villagers, it is a relief not to have to pay this amount anymore.

The home gardens benefit the beneficiaries in two different ways as they provide vegetables for consumption as well as for selling, which improves their income; curly cabbages, for instance, fetch 3,000 riels per kg. The setup of the home gardens makes it easy for villagers to grow vegetables all year round, unlike other traditional vegetable gardens:

The home garden allows me to grow vegetables in both dry and rainy seasons. If I plant on the land directly, I can't grow vegetables in the rainy season as they might get damaged by flood. (KII in Moha village)

Figure 10: Home garden with drip irrigation system



Positive impacts

The wells provide safe water for cooking, bathing, washing clothes and drinking. The villagers truly appreciate having access to those wells:

The latrines and water storage tanks have helped to improve sanitation and most of the villagers were satisfied with this support:

Table 3: Ways in which the program has benefitted different vulnerable groups

Vulnerable groups	Benefits from MRD's program
Women-headed households	Thanks to the wells, they are now able to save some money as they no longer have to buy water. It is now more hygienic to defecate as they have a proper latrine to use. They can save water from the water collection tank and can earn some extra money from the home garden.
Elderly	They get clean water from the wells for daily use and for watering the home garden. They also eat fresh vegetables from the home garden and can defecate hygienically at the latrine provided.
Children	Their health is improved because they have a clean latrine and eat fresh vegetables from the home garden. They also have more water to use because they have a water collection tank.
People with disabilities	They eat fresh vegetables from the home garden, have a hygienic latrine and get more water from the wells and water collection tanks.
Poor households	The vegetables from the home garden help supplement their food budget. The water from the water collection tank is helpful as they no longer have to buy water. They also benefit from the latrine and better hygiene as they no longer have to defecate in random places.

Table 4: Families accessing rural facilities by village, Kampong Svay district, Kampong Thom province (percent)

Village	Energy for cooking			Energy for lighting			Toilet			Water source for domestic consumption					
	Firewood	Electricity	LPG and others	City Power	Battery	Others	Do not use toilet	Improved toilet	Unimproved toilet	Piped water	Well/ underground water	Surface water	Water from truck/cart	Bottled water	Others
Ampil	100.0	0.0	0.0	73.9	26.2	0.0	0.0	100.0	0.0	11.7	69.9	2.9	0.0	0.0	15.5
Bou Pueng	97.9	0.7	1.4	5.6	93.7	0.7	45.8	52.2	2.1	3.5	0.0	33.1	22.5	40.8	0.0
Damrei Slab	98.3	0.0	1.7	89.8	8.5	1.7	11.9	83.1	5.1	1.7	98.4	0.0	0.0	0.0	0.0
Kampong Krabei	92.5	0.0	7.6	28.0	69.9	2.2	2.2	97.9	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Lvea Choum	91.7	0.4	7.8	79.4	18.4	2.2	9.2	34.2	56.6	5.3	94.3	0.0	0.0	0.0	0.4
Mohar	95.8	0.0	4.2	34.9	64.2	1.0	18.4	79.7	1.9	3.4	90.6	0.9	1.4	3.3	0.5
Ou Sala	100.0	0.0	0.0	22.1	77.0	0.9	34.2	59.5	6.3	0.0	40.6	43.7	15.8	0.0	0.0
Peam Kraeng	98.6	0.0	1.4	66.0	32.9	1.1	16.8	78.9	4.3	0.0	2.2	97.9	0.0	0.0	0.0

Source: General Population Census 2019 ([https://www.nis.gov.kh/nis/Census2019/Final General Population Census 2019-English.pdf](https://www.nis.gov.kh/nis/Census2019/Final%20General%20Population%20Census%202019-English.pdf))

The latrine is very useful for those households that are not able to build their own and anyone can access it because it's built for the public (KII, male respondent in Bopeung village).

The latrines, especially, have kept the communities clean and in good health. They are most helpful for school children, who no longer have to go into the forest to defecate, which means sanitation is greatly improved:

The latrine is convenient. I don't need to go far to find a place. Before, we just went into the forest, but we no longer have to do that. (KII, male respondent in Slaeng village)

Best practices

- MRD should expand the provision of latrines and water tanks in schools and commune festival halls.
- Wells help people cope with water shortages in the dry season. Project beneficiaries should be selected carefully to make sure they can afford to repair and maintain the wells.
- Home gardens should be provided to those whose primary jobs are vegetable growers.

Remaining problems and actions

- Villagers reported that water from the MRD-provided well in Moha village, Chey commune, Kampong Svay district, smells bad. They were therefore reluctant to use it. Maintenance support is also inadequate. One of the wells was out of order as soil had fallen in and blocked the borehole. The beneficiaries asked the authorities for help to restore the well but none was provided. The locals said they do not always have the resources needed to repair the wells themselves.

◦ Actions:

- Study the quality of groundwater carefully before digging wells to avoid the issue of foul-smelling water.
- Seek technical support from technical staff to help with groundwater studies and to resolve the smell issue.

- Set up a team to monitor water quality regularly (every 3 to 6 months).
- Continue providing support for repairing and maintaining the wells.
- The wells do not provide enough water to meet demand. Lack of water during the dry season was raised by many villagers (Table 4): "The villagers and my family face the same problem. Every year, we don't have enough water for our daily consumption or to use for gardening during the dry season" (KII, female respondent).
 - Actions:
 - Increase the number of water sources such as digging more commune ponds for storing water in the dry season.
 - Provide more water storage tanks to more households.
 - Identify areas where commune ponds can be established so that people can have access to water all year round.
- Several home gardens were abandoned because the beneficiaries (mostly poor households or elderly people) had to do other paid work as the home garden alone did not generate enough income. Also, the villagers cannot afford to repair garden equipment themselves: "Home garden tools are hard to replace when they break, like a drip system. Plus, they are expensive" (KII in Moha village).
 - Actions:
 - Provide home gardens to beneficiaries whose primary occupation is vegetable growing. If selecting other beneficiaries, consider the overlap between their primary jobs and project outputs.
 - Increase awareness-raising among the beneficiaries on ownership of project outcomes.
 - Provide agricultural training to the beneficiaries before setting up home gardens. Although much training has been done already, it would be helpful to ensure that 1) future training addresses exactly what skills the beneficiaries lack and 2) the jobs of the project beneficiaries are linked with the project outputs.

- Provide a variety of seeds and more agricultural inputs to increase the productivity and income potential of home gardens.
- Continue to monitor and support the beneficiaries with tools to maintain and repair home garden equipment.
- Monitor and support the beneficiaries until they are fully capable of handling the home gardens themselves. Request MRD to inspect the home gardens often.
- Assist with finding markets that buy crops at a good price from the villagers who have a home garden. The plan to support farmers in finding markets as stated in MRD Policy 5: Diversify Rural Economy and SMEs should be accelerated and prioritised.
- Establish agricultural associations (e.g. chicken raising group, cow raising group, vegetable growing group) to enable mutual self-help through sharing experiences and to strengthen producers' bargaining power.

- The only major problem with the use of latrines concerns accessibility. The design of the latrines – raised to be resilient to floods – means that people with disabilities cannot use them easily, if at all (see Figure 9).

◦ Action:

- Consider the needs of people with disabilities when designing latrines, making sure they can access and use them.

- Rural road conditions in Kampong Svay district are poor during the rainy season, with slippery surfaces and vehicles getting stuck in the mud. Dirt roads are easily damaged by heavy trucks and tractors. Restoring the muddy road along the Kahna Canal in Kampong Svay district (Figure 11), which is the main road for taking rice and other products to market, is key to improving community wellbeing.

◦ Actions:

- Rehabilitate more roads in remote areas to ease travel.

- Improve/repair poor quality roads so that villagers can travel more conveniently.
- Rehabilitate the road along the Kahna Canal in Kampong Svay district to improve local livelihoods as it is the main road for transporting rice to market.

Figure 11: Muddy road along the Kahna Canal in Kampong Svay district after the rains



- There was a serious dry season water shortage at the time of study. Rice farmers had to buy irrigation water, which in 2019 cost USD80 per ha and in 2020 USD90 per ha. The prices of other agricultural inputs (fertiliser, labour, pesticide) are also rising. Agricultural markets are not stable.

◦ Actions:

- Dig more commune ponds to store water in the dry season.
- Form agricultural associations to enable mutual self-help and gain technical and financial supports in the form of agricultural inputs and market linkages from private sector organisations, government agencies, and NGOs.
- Plant more trees to increase forest cover and groundwater storage.

- Natural disasters affect all households but female-headed households and poor households are more likely to get sick and do not have enough money to buy medicine. The climate is getting drier, with less though more intense rainfall and lightning strikes in 2019 and 2020.

- Actions:
 - Consider providing financial and health assistance for female-headed and poor households.
 - Install lightning protection equipment in Kampong Svay district to prevent further loss of animal and human life, and raise awareness about deaths and injuries caused by lightning.
 - Consider allocating some commune council budget for climate change activities.
- Address the needs of different vulnerable groups:
 - Actions:
 - For female-headed households: provide female household heads with training on how to grow vegetables, raise chickens/ animals and negotiate prices. Provide training on craftwork.
 - For the elderly: introduce older people to home gardens, support them with a monthly stipend, and subsidise piped water costs. The social safety net program should be fair and transparent for all.
 - For people with disabilities: provide training on how to raise chickens and give them chickens to raise, subsidise piped water costs, and provide some financial support. The social safety net program needs to be inclusive of people with different types of disabilities.
 - For children or students: provide them with a scholarship program that covers the cost of education and study materials, and offer them education on climate change. Build community kindergartens. There are not enough classrooms, however.
 - For poor households: support them with irrigation systems, build more wells for them, provide training on how to cultivate crops and raise animals more effectively, and how to deal with insect infestations and animal diseases.
- The integration of climate change issues into commune council annual planning activities and budget allocation was limited. The biggest priorities for commune councils are basic infrastructure (water and electricity supplies, road network) and services (healthcare and education facilities).
 - Actions:
 - Increase the commune budget for climate change activities and planning.
 - Seek funds from development partners, private sector organisations, and charities.
 - Increase leaders' and policymakers' awareness about the impact of climate change on rice production and livelihoods.
- Respondents' incomes had decreased because of climate change impacts (higher temperatures, prolonged dry season and water shortages for rice cultivation) and because of Covid-19, especially loss of remittance. Lost income for construction workers amounted to USD10 per day, and lost remittance for the families of garment factory workers amounted to USD50 per month. Factory workers lost on average USD250 per month. The pandemic also disrupted children's education. Many children were unable to attend online classes because of a lack of study facilities, particularly those without access to a smartphone.
 - Actions:
 - Instigate monthly cash transfers via mobile for Covid-19 affected households.
 - Increase sanitation campaigns from the Ministry of Health such as the three "Don'ts" (crowded places, enclosed areas without ventilation, physical contact) and the three "Protections" (wearing masks, washing hands, keeping 1.5 m away from others).
 - Encourage local authorities and school communities to seek low-cost and low-technology ways to help children continue their studies in the event of further covid-19 related school closures.