

A photograph showing a person riding a motorcycle on a wooden raft in a flooded area. The raft is made of wooden planks and has a thatched roof. The water is brown and murky. In the background, there are trees and a small building. The sky is blue with some clouds. The image is split into two parts: a blue and white diagonal section on the left and a white section on the right.

**TESTING THE
ADDED VALUE
OF MARKET
INCENTIVES ON
DISASTER RISK
REDUCTION IN
WESTERN NEPAL**

Report Brief
July, 2018

RESEARCH BACKGROUND

Figure 1: Map of MRED Target Districts

Central and Western Nepal experienced several devastating flooding events from August 11 – 14, 2017, resulting in 180 deaths, 445,000 displaced households, 63,000 fully destroyed homes and 118,000 partially destroyed homes¹. In addition to this, the Ministry of Agriculture reported that 10 million U.S. dollars’ worth of crops were destroyed and nearly 70,000 livestock died due to the flooding². The 2017 floods covered 35 of 75 districts across Nepal, inundating up to 80% of the land in the Terai region where Mercy Corps works. Since 2013, the Managing Risk through Economic Development (MRED) program, funded by the Margaret A. Cargill Philanthropies (MACP), has been working to build resilience to flooding in the Far Western region of Nepal. MRED promotes an integrated intervention model (“nexus model”) that combines traditional community-based disaster risk reduction (DRR) approaches with interventions designed to increase market access for crops that have risk reduction potential. The following market models under the nexus approach were implemented:



- Planting sugarcane on erosion-prone riverbanks to prevent river cutting while increasing productivity of marginal lands and increasing income
- Planting fodder species in marginal lands of hilly areas to mitigate landslides while also contributing as an input for growth of the dairy sub-sector

COMPARING THE “NEXUS” MODEL TO TRADITIONAL DRR

In Nepal, traditional DRR approaches historically consist of forming and/or strengthening local government-led disaster management and response committees, developing local Disaster Management Plans, training committees on key aspects of response, including First Aid and Search and rescue, and linking committees with early warning systems.

The MRED Nexus Model seeks to create economic incentives for investment disaster resilience by building market linkages for crops that have the potential to protect land from natural disaster risk. These market-based interventions are complemented by building access to financial services, improving bio-engineering and land management on risk prone land, and addressing gender-based norms and attitudes.

¹ Relief Web (2017). Nepal: Terai Flood – August 2017 (Version 2.0, Date Released 28 August 2017). Retrieved from <https://reliefweb.int/report/nepal/nepal-terai-flood-august-2017-version-20-date-released-28-august-2017>

² Relief Web (2017). Nepal: Flood 2017 – Office of the Resident Coordinator Situation Report No. 3 (as of 18 August 2017). Retrieved from <https://reliefweb.int/report/nepal/nepal-flood-2017-office-resident-coordinator-situation-report-no-3-18-august-2017>

The core nexus model is complemented by interventions that address multiple dimensions of vulnerability to disaster risk. These include building access to financial services, improving land management and protection mechanisms on communal risk-prone land, and addressing gender-based norms and attitudes that limit women's ability to support risk reduction (see figure 2).

This study aims to understand whether households living in communities benefiting from combined market-based and traditional DRR activities (MRED's nexus model) were better off after the 2017 floods relative to households living in communities without these integrated activities. Specifically, the study explores whether nexus households 1) accessed key resilience resources - financial, social, physical, human and natural prior to the flood, 2) used those capacities to respond to appropriately respond to the flooding and 3) were able to maintain or improve their well-being relative to non-nexus households.

Figure 2: MRED's Nexus Approach



METHODOLOGY

Design

This analysis uses a quasi-experimental design called Propensity Score Matching (PSM), which builds an inference about the impact of a treatment on the outcome of an individual based on matching with individuals who share the same probability of receiving treatment³. In this analysis, the treatment is measured through recorded MRED (Nexus)

activities at the village level and the individual level. The probability of receiving treatment is calculated through explanatory variables that are likely to be associated with individuals that participated in the MRED (Nexus) program. This probability is then collapsed into a 'propensity score' which is used in the analysis. This approach allows for a comparison between beneficiary households who participated in the Nexus activities against households from other communities with similar demographic and disaster-risk profiles. Among the 52 Nexus communities in the MRED implementation area, 28 communities were selected for this study. They were matched with an equal number of communities in the same municipalities who shared as many characteristics as possible (except for participation in MRED). Within nexus and non-nexus communities, around 20 and 10 households per community were selected respectively (472 nexus households and 292 non-nexus households in total).

NEXUS = Incentivizing DRR through access to markets for disaster resilient products, in addition to strengthening and building the capacity of DRR committees.

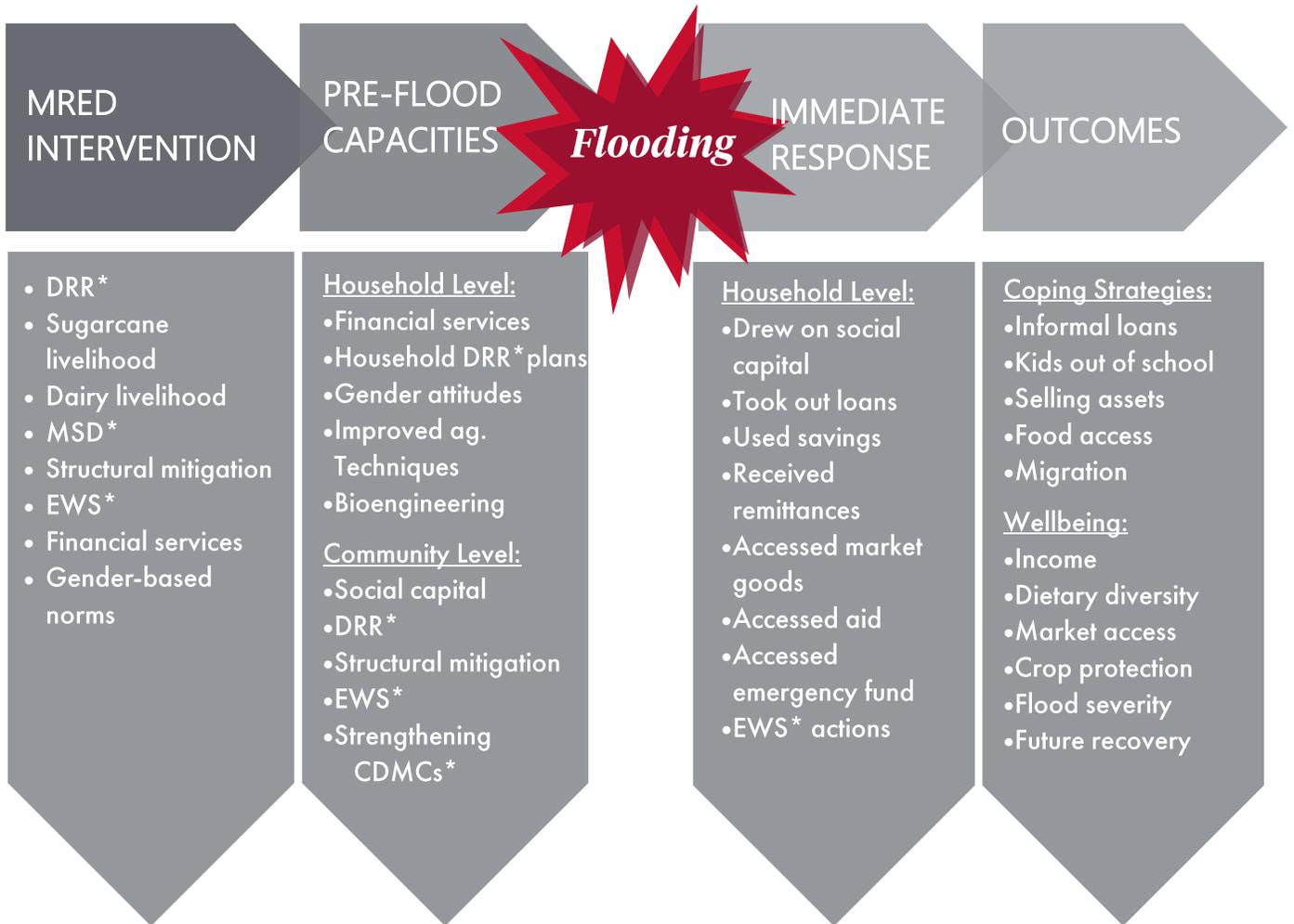
RESILIENCE CAPACITY = A resource or strategy –social, physical, financial, human, and natural – that households can access or use to mitigate their sensitivity and exposure to risk, and to respond when a shock occurs.

Research Questions

1. Are households living in "nexus communities" more resilient to flooding than flood-affected households living in non-nexus communities?
 - How did "nexus" households compare to "non-nexus" households in their ability to access resilience capacities prior to the floods
 - How did nexus and non-nexus households differ in their use of resilience capacities to respond to the 2017 floods?
 - How did nexus households differ in their use of negative coping strategies to respond to the 2017 floods?
 - How did nexus and non-nexus households, compare in their wellbeing outcomes after the flood?
2. Do nexus households' results differ by key demographic and social attributes (caste, gender of the head of household, proportion of community who have migrated)?

³ Rosenbaum PR, Rubin DB. The central role of the propensity score in observational studies for causal effects. *Biometrika* 1983 70: 41-55.

Figure 3: MRED Theory of Change



*DRR = Disaster Risk Reduction

*MSD = Market System Development

*EWS = Early Warning System

*CDMC = Community Disaster Management Committee

KEY FINDINGS & RECOMMENDATIONS

MRED households benefiting from the DRR and market-based nexus model had higher levels of household-level capacities important for disaster preparedness and were able to use these capacities at higher levels to respond to the 2017 floods than non-nexus households.

Households participating in the nexus interventions reported that they had household-level DRR plans 16% more often than non-nexus households and that once the flooding hit, they evacuated to a safe place, collected documents and assets, evacuated livestock and warned neighbors 17% - 25% more often than non-nexus households. Nexus households reported that they were familiar with risk-mitigating agricultural techniques 23% more often than non-nexus households, which are targeted at increasing nexus crop cultivation and improving land management and reported access to savings at higher rates than households living in non-nexus communities (70% versus 50%) prior to the monsoon. Nexus households also used these savings to respond to the 2017 flooding events 20% more often than non-nexus households. However, this was only true when including geographic location in the model. This suggests that using savings to respond to the 2017 flooding events was not uniform across all MRED target areas.

Recommendation: Access to resources is not enough: support communities to plan and respond to disasters by employing resilience strategies. Resilience programs should focus their implementation approach on uptake of context and shock-specific strategies for crisis mitigation, which requires effective targeting of interventions, demonstration of benefits of adopting new strategies and creation of incentives.

Recommendation: Use market-based incentives to nudge behavior and promote long-term and sustainable investment in DRR. Focus disaster risk assessments on investigating ways to reinforce positive behaviors through market-based incentives, which can then be embedded into the design of the intervention approach. Local disaster management planning agencies should look beyond disaster mitigation planning and explore resilient livelihoods and nexus opportunities. This will require better cooperation with wider actors including the private sector, particularly financial service providers and government agencies.

Figure 4. Loans/Savings/Remittances Before Flooding

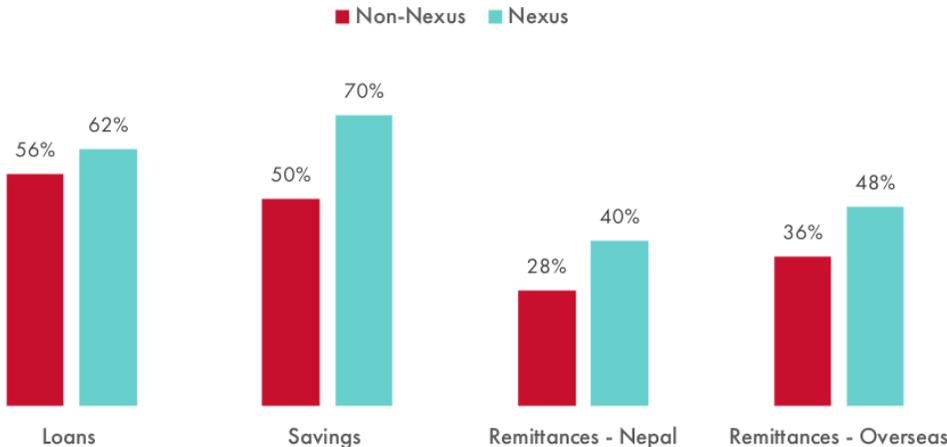
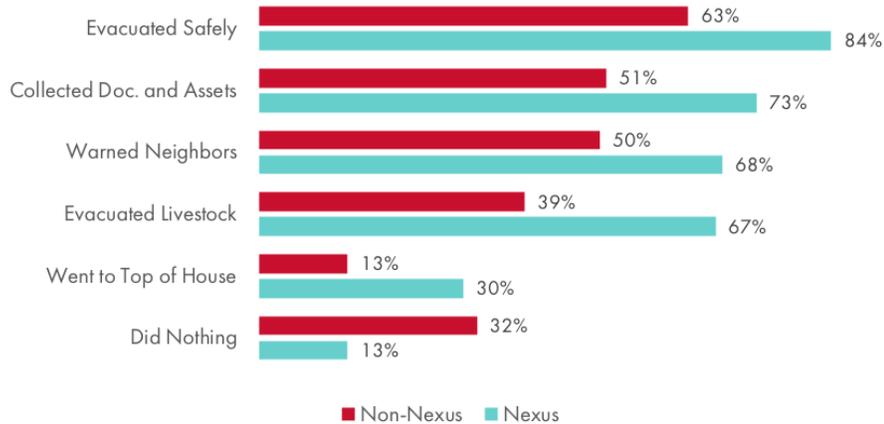


Figure 5: Actions Households Took after Receiving Early Warning Information



MRED’s nexus approach overwhelmingly supported households’ access to community-level resilience capacities at higher rates – relative to households not participating in the nexus interventions.

NEXUS HOUSEHOLDS = HIGHER COMMUNITY-LEVEL CAPACITY

- Higher use of structural mitigation to protect communal land
- Higher rate of reporting on community DRR plans
- Higher confidence in local DRR committees
- Higher rates of bonding and bridging

In comparison to non-nexus households, nexus households reported higher levels of pre-monsoon community-level resources and strategies important for reducing the causes of natural hazards, including: 47% higher usage of structural mitigation to protect land, higher confidence in bio-engineering techniques to stabilize river beds (0.5 out of 1 – 5 confidence scale), 26% higher rates of active community disaster management committees (CDMCs), and more reporting of community disaster response plans (51%) and EWS (50%). Agreement that CDMCs and early warning task force actors work actively to help the community prepare for flooding prior to the monsoon was much higher among nexus

households in comparison to non-nexus households (1.5 and 1.3 difference out of a 1 – 5 agree/disagree

Figure 6: Households Using Loans and Savings Post-Monsoon

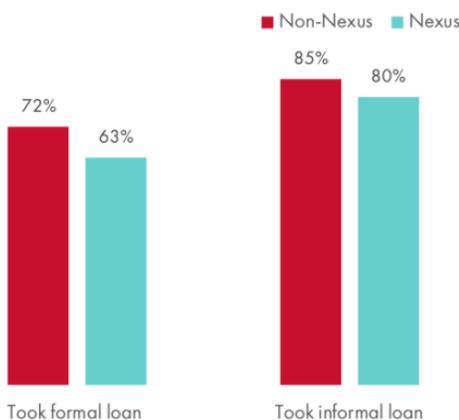
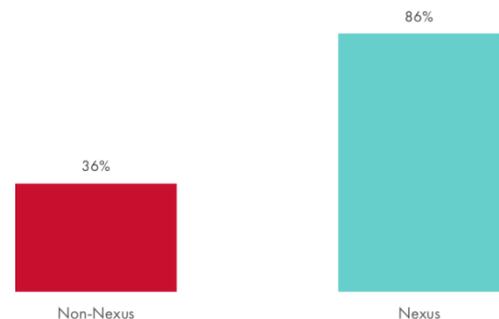


Figure 7: Households Receiving Early Warning Information



scale).

Households participating in nexus interventions reported working with and supporting social networks both within and outside their own caste/community following the 2017 flooding events at higher rates than non-nexus households. This included engaging in collective land protection measures, participating in *perma* (mutually beneficial exchange of labor), being able to count on people when they needed help, supporting others to recover from shocks, and regularly cooperating with communities on recovery and restoration measures. The high level of bonding (ability to rely on members of one’s own caste/community for help) and bridging (ability to rely on members of other castes/communities for help) before and after the 2017 flooding events indicates that the drive to work together and help others did not erode in nexus communities after this disaster. In contrast, non-nexus households reported much lower rates of bonding and bridging social capital before and after the 2017 flooding events. Nexus households were also more likely to believe they can influence their CDMC and district level office than non-nexus households, which demonstrates greater linkages with government and outside organizations.

Recommendation: Committees, trainings and plans are not enough: promote holistic approaches to DRR that address ecological, economic and social vulnerabilities. Future resilience programs should design integrated intervention approaches that focus on improving existing DRR systems while also addressing context-specific vulnerabilities.

Figure 8: Average Levels of Community Capacities

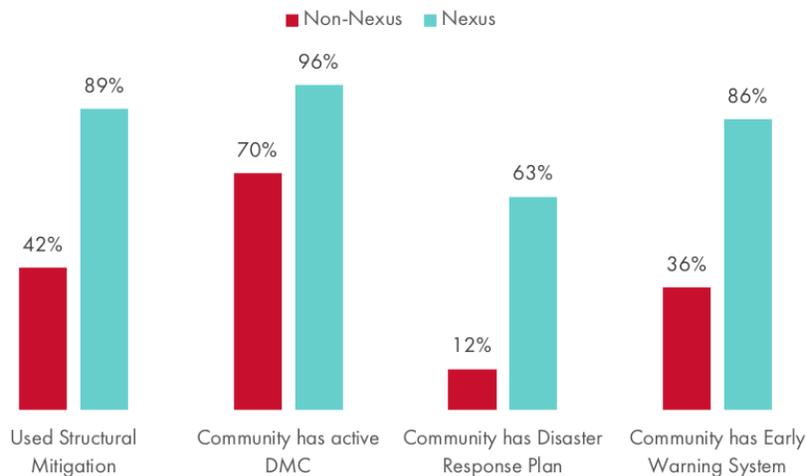
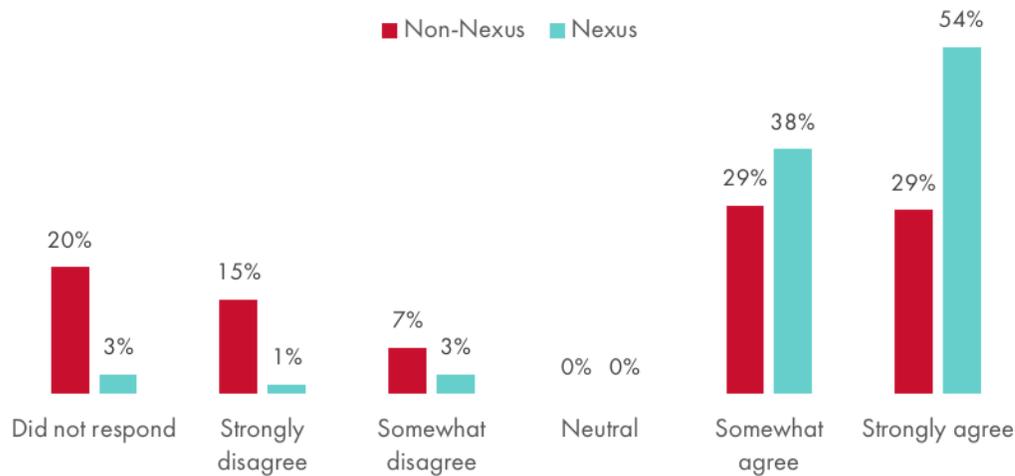


Figure 9: Bonding: Following Monsoon, Community Worked Together on Recovery and Restoration



Nexus households relied on fewer negative coping strategies and lost fewer crops and agricultural inputs than non-nexus households after the 2017 flooding events.

Overall, nexus households reported lower rates of reliance on negative food coping strategies after the 2017 flooding events than non-nexus households. On average, their negative food coping strategies score was 3.35 points lower than non-nexus households. Considering the mean Coping Strategies Index (CSI) core was about 12, this is a large absolute difference. Nexus households took out loans from local money lenders 11% less often than non-nexus households as a response to the 2017 flood events. However, this effect may not be uniform across all MRED implementation areas. Nexus households lost fewer crops (408 kilos when not considering geographical differences, 119 kilos when considering geographical differences) and reported lower rates of agricultural input loss (7-9 percentage points lower) than non-nexus households. Although these decreases are relatively small, they are statistically significant.

Nexus households reported higher-levels of dietary well-being, perceived higher levels of recovery, and were more confident in their ability to recover from similar shocks in the future, relative to non-nexus households.

Nexus households reported less income disruption (12 percentage points less) and greater diet diversity (0.5 more food groups) following the 2017 flooding events than non-nexus households. However, these benefits were not achieved across all MRED communities. There were no statistically significant differences in whether income was interrupted or restarted (after it was interrupted) or in expenditures following the 2017 flooding events between nexus and non-nexus households. In addition, nexus households were 12% more likely to strongly agree that they had recovered from the 2017 flooding events than non-nexus households when controlling for other factors. Nexus households were also 21.5% more likely to be “fully confident” in their ability to cope with future shocks and stresses than non-nexus households when controlling for other factors. These results did not differ by caste or head of household gender. Positive perceptions of recovery and ability

to cope in the future are key indicators of whether households feel resilient after a shock. Feeling more resilient allows households to move forward and live healthy and productive lives despite facing shock and stresses.

Marginalized groups were not able to achieve the same positive outcomes as more privileged groups in MRED target areas, suggesting social inequalities may have a large influence on outcomes.

Social inequalities had a significant influence on recovery and wellbeing trajectories. Janajatis lost 7 quintals less crops on average and reported losing agricultural inputs due to flooding 23% less often than Dalits (most marginalized caste group). This may be driven by an over representation of Janajati households in the MRED sample population. Female heads of household lost 4 quintals more crops on average due to flooding than male heads of household. Brahmin/Chetris (most privileged caste group) and Janajatis reported 10-13 less CSI score points on average than households in the Dalit caste group – a difference that is equal to the overall average CSI score. Brahmin/Chetri households borrowed from informal money lenders 23% less often than Dalit households in response to the 2017 flooding events. Female heads of household had to borrow from money lenders 12% more often than male heads. Brahmin/Chetri households also had much better diet diversity (1.4 more food groups) than Dalit households.

Recommendation: Actively address discriminatory social norms as part of inclusion strategies to achieve disaster resilience for the most vulnerable groups. Include gender and social inclusion barriers in disaster risk assessments. Share findings with key community decision-making bodies to ensure marginalized groups have a space to participate in community decision-making processes and disaster planning and are encouraged to adopt resilience strategies. Programs should also integrate proven gender and social inclusion interventions, such as intra-household dialog activities, into existing program approaches.

CONCLUSION

The MRED program's "nexus model" aims to build resilience to ecological and economic shocks by implementing program strategies that both mitigate the risk of natural disasters and provide a profitable income generating source. This study sought to evaluate whether the nexus model added value to a traditional DRR approach among communities who experienced several severe flooding events in August 2017 in Western Nepal. Results from this study show a clear benefit of MRED's nexus model over the traditional DRR approach. Households participating in the nexus intervention reported higher rates of key household and community-level capacities and use of these capacities prior, during and after the 2017 flooding events than non-nexus households. After the 2017 flooding events, nexus households perceived higher levels of recovery, were more confident in their ability to recover from future shocks and reported less income disruption than non-nexus households. Although nexus households lost fewer crops and agricultural inputs, relied less on negative coping strategies and had better diet diversity than non-nexus households after the 2017 flooding events, marginalized groups were not able to achieve the same results. Development actors should integrate learning from MRED's nexus approach into future resilience programming by designing integrated intervention approaches that improve existing DRR systems and address context-specific vulnerabilities, embedding market-based incentives into program approaches, focusing on increasing uptake of context and shock-specific strategies and creating transformative change for marginalized groups within target communities so that they are able to build resilience even in the most vulnerable groups.

CONTACT

JILL SCANTLAN

Regional Resilience Measurement Advisor | SSEA

jscantlan@mercycorps.org

OLGA PETRYNIAK

Regional Resilience Director | SSEA

opetryniak@mercycorps.org

CHET TAMANG

MRED Program Director | Nepal & Timor Leste

ctamang@mercycorps.org

About Mercy Corps

Mercy Corps is a leading global organization powered by the belief that a better world is possible. In disaster, in hardship, in more than 40 countries around the world, we partner to put bold solutions into action — helping people triumph over adversity and build stronger communities from within. Now, and for the future.



45 SW Ankeny Street
Portland, Oregon 97204
888.842.0842
mercycorps.org