SUSTAINED HYGIENE BEHAVIOUR CHANGE: AN EVALUATIVE RESEARCH REPORT CONDUCTED IN KOTGAUN VDC, NEPAL

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# TABLE OF CONTENTS

**TABLE OF CONTENTS**

TABLE OF CONTENTS .................................................................................................................. ii  
LIST OF ACRONYMS .................................................................................................................. iii  
ACKNOWLEDGEMENTS ........................................................................................................... iv  
EXECUTIVE SUMMARY ............................................................................................................ v  

INTRODUCTION AND BACKGROUND ...................................................................................... 1  
  Nepal: overview ....................................................................................................................... 2  
  WASH in Nepal ....................................................................................................................... 3  
  Rolpa District ......................................................................................................................... 4  
  NRCS and Rolpa District Project .......................................................................................... 5  
DETERMINANTS OF HYGIENE BEHAVIOUR CHANGE: Literature review ....................... 7  
RESEARCH METHODS ............................................................................................................. 12  
FINDINGS .................................................................................................................................. 14  
  ARE HYGIENE BEHAVIOIRS SUSTAINED? ........................................................................ 14  
  DRIVERS OF BEHAVIOUR CHANGE: Societal/structural ............................................... 20  
  DRIVERS OF BEHAVIOUR CHANGE: Community ........................................................... 23  
  DRIVERS OF BEHAVIOUR CHANGE: Interpersonal ........................................................ 34  
  DRIVERS OF BEHAVIOUR CHANGE: Individual ............................................................... 37  
  DRIVERS OF BEHAVIOUR CHANGE: Habitual .................................................................. 39  
CONCLUSION AND RECOMMENDATIONS ............................................................................ 41  

ANNEX 1: Brief political background to Nepal ...................................................................... 48  
ANNEX 2: Models of hygiene behaviour change ................................................................... 49  
ANNEX 3: Research team and research schedule ................................................................ 51  
ANNEX 4: Notifications/treatment of WASH-related diseases in Rolpa District .................... 52  
ANNEX 5: Malaria in Nepal .................................................................................................... 54  

REFERENCES ............................................................................................................................ 55
### LIST OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ARC</td>
<td>Australian Red Cross</td>
</tr>
<tr>
<td>DD</td>
<td>Diarrhoeal Disease</td>
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<tr>
<td>DDC</td>
<td>District Development Committee</td>
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<tr>
<td>CBOs</td>
<td>Community Based Organizations</td>
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<tr>
<td>CLBSA</td>
<td>Community-Led Basic Sanitation for All</td>
</tr>
<tr>
<td>CLTS</td>
<td>Community Led Total Sanitation</td>
</tr>
<tr>
<td>DC</td>
<td>District Chapter</td>
</tr>
<tr>
<td>DFAT</td>
<td>Department of Foreign Affairs and Trade</td>
</tr>
<tr>
<td>FGD</td>
<td>Focus Group Discussion</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GWSI</td>
<td>Global Water and Sanitation Initiative</td>
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<tr>
<td>HDI</td>
<td>Human Development Index</td>
</tr>
<tr>
<td>HW</td>
<td>Handwashing</td>
</tr>
<tr>
<td>HWS</td>
<td>Handwashing station</td>
</tr>
<tr>
<td>HWWS</td>
<td>Handwashing with soap</td>
</tr>
<tr>
<td>HQ</td>
<td>Headquarters</td>
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<tr>
<td>IFRC</td>
<td>International Federation of the Red Cross and Red Crescent Societies</td>
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<tr>
<td>IHSSC</td>
<td>Institute for Human Security and Social Change</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
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<tr>
<td>MOHP</td>
<td>Ministry of Health and Population</td>
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<tr>
<td>NPR</td>
<td>Nepalese Rupee</td>
</tr>
<tr>
<td>NRCS</td>
<td>Nepal Red Cross Society</td>
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<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>OD</td>
<td>Open Defecation</td>
</tr>
<tr>
<td>ODF</td>
<td>Open Defecation Free</td>
</tr>
<tr>
<td>PHAST</td>
<td>Participatory Hygiene and Sanitation Transformation</td>
</tr>
<tr>
<td>SAARC</td>
<td>South Asian Regional Association for Regional Cooperation</td>
</tr>
<tr>
<td>SC</td>
<td>Sub-Chapter (Nepal Red Cross Society)</td>
</tr>
<tr>
<td>SLTS</td>
<td>School Led Total Sanitation</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>VDC</td>
<td>Village Development Committee</td>
</tr>
<tr>
<td>VIP</td>
<td>Ventilated Improved Pit (Latrine)</td>
</tr>
<tr>
<td>WASH</td>
<td>Water, sanitation and hygiene</td>
</tr>
<tr>
<td>WAT/SAN</td>
<td>Water and sanitation</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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</table>
ACKNOWLEDGEMENTS

This project and report has been made possible due to the support, engagement and commitment of people from both Nepal Red Cross Society and Australian Red Cross. Thanks to: Amar Mani Poudel (NRCS WASH co-ordinator) for his advice, communication and input in the months leading up to the fieldwork, and during our time in Nepal; Ritva Jäntti (ARC Nepal Country Co-ordinator, NRCS), for the communication, logistical arrangements, time and support while in Nepal; Yogendra Giri (NRCS HQ driver) who got us safely to the field and back; Samista Manandhar (NRCS M&E Officer) for her efficiency and energy in supporting and assisting with the fieldwork and preliminary analysis; Binod Dangi and Kusum Acharya for translation during interviews and group discussions.

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The partnership between the La Trobe University researchers and Australian Red Cross was developed and supported through the Institute for Human Security and Social Change (IHSSC), based at La Trobe University, with specific input from the Director of IHSSC, Chris Roche, and the Program and Partnerships Manager, Yeshe Smith.

Finally, thanks to all the people in Kotgaun VDC, Nepal, with whom we met and talked during household visits, interviews and group discussions.

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4 See <http://www.nrcs.org/>
5 See <http://www.latrobe.edu.au/research/research-focus-areas/building-healthy-communities>
6 See <http://www.latrobe.edu.au/socialchange>
EXECUTIVE SUMMARY

Nepal Red Cross Society (NRCS) has implemented water and sanitation activities with the support of partners for over 30 years. A particular focus has been on hygiene behaviour change (e.g. elimination of open defecation, handwashing with soap) in order to improve health. Lessons learned from these programmes have informed current NRCS programming strategies and approaches, which include community- and school-led ‘total sanitation’ programmes, empowerment of women, and the use of social pressure, rewards and recognition.

Globally, most Red Cross Red Crescent WASH projects use participatory methodologies and health messaging to promote hygiene behaviour change. Conventionally, evaluations of these programmes occur immediately following the end-point of the programme, making it difficult to assess long-term impacts of the intervention and the sustainability of the programme (Gonzalez et al. 2013). Evidence, however, from broader health project evaluations indicates that health messaging is a poor motivator of behaviour change, and hygiene behaviours often decrease when the focus provided by the intervention dissipates.

In partnership with Austrian Red Cross/Austrian Development Corporation, NRCS implemented a water, sanitation and hygiene project in Kotgaun Village Development Committee (VDC) in Rolpa District between August 2008 and February 2012. Activities to support hygiene behaviour change in the target communities included: installation of hardware (toilets, handwashing platforms etc.), training of community-members in wat/san hardware installation, group/committee formation (e.g. junior/youth Red Cross circles, women’s groups, water user committees), recruitment of female Village Health Motivators, health and sanitation education and awareness raising, sanitation message display boards, street drama, handwashing training and demonstration, home visits, events (handwashing day etc.), and WASH campaigns to include women and under-privileged people. An IFRC ‘look-back study’ was conducted in December 2013 almost two years post-project completion. It suggested that while people had retained awareness of the importance of sanitation and hygiene, some hygiene behaviours had decreased, specifically self-reported handwashing rates at some critical times (Gonzalez et al. 2013). However, the report expressed concern about the reliability of these findings (due to challenging conditions in the field that limited supervision and quality control of data collection).

In late 2013, Australian Red Cross secured funding through the DFAT Civil Society (CS) WASH Fund for a four year WASH project in Nepal: the Sanitation, Hygiene and Water Management Project. The new project is being implemented in five Village Development Committees (VDCs) in Bajhang District in far-Western Nepal. These funds included an allocation for research. The look-back study findings prompted Australian Red Cross to seek further evaluation of this project site in order to better understand the drivers and barriers to sustained hygiene behaviour change. This evaluative project focused on Kotgaun VDC, in remote mid-Western Nepal. Key questions guiding this project included:

1. What are the motivators and obstacles to sustained hygiene behaviour change in Red Cross project areas in Nepal (i.e. Kotgaun VDC)?
2. How does having a local Red Cross presence (in the form of a functioning sub-chapter with members and volunteers) in the community contribute to the sustainability of projects?
3. How can Red Cross projects better select or adapt hygiene behaviour change approaches to improve the impact of WASH interventions?
KEY FINDINGS

Context: Nepal is one of the poorest countries in the world, with low levels of development and persistent social inequalities and poverty. While there has been significant progress in water and sanitation coverage, many rural and remote areas still have low coverage rates. Water, sanitation and hygiene continue to present significant challenges to population health in Nepal. Rolpa district is located in the remote mid-Western region. It has low development status, with almost half of the population living below the poverty line. During the decade-long civil conflict, which started in 1996, Rolpa was at the centre of the political unrest and was a Maoist stronghold of the Communist Party of Nepal. While there remain persistent gender inequalities in Rolpa, the conflict has reportedly led to some improvement due to the Maoist emphasis on women’s liberation and participation. Predominant caste groups include Hill Janajati (Mogur), Chhetri and Dalit. Employment opportunities in the district are limited, and many young men migrate to seek alternative income sources. Contextual factors, such as those mentioned here, shape the effectiveness and sustainability of development efforts. Identified opportunities and challenges relating to hygiene behaviour change in Kotgaun VDC, Rolpa district, cannot provide a blueprint for WASH projects in other communities. Nonetheless, this evaluation provides evidence of the diverse drivers of hygiene behaviour change. It highlights the importance of adaptive programming that responds to local contexts and builds on the strengths of communities, including the commitment of NRCS volunteers.

Hygiene behaviour change: Evidence from this evaluation suggests that hygiene behaviour change has been widely sustained in Kotgaun VDC. Almost every household observed had a pour-flush toilet that was being regularly used and maintained, and there was very limited evidence of open defecation. There was high knowledge of critical times for handwashing and high self-reported HWWS (the data collection did not include structured observation of HWWS). Some participants reported, however, a decline in safe handling of water and environmental/household cleanliness in the post-project phase. Data from the Rolpa District Public Health Office provided quantitative evidence of declines in key hygiene/water-related disease such as diarrhoeal disease (in accordance with community-wide views that diarrhoeal disease had reduced).

Drivers and barriers to hygiene behaviour change: Health behaviour change is notoriously difficult to initiate and sustain. In order to plan and implement hygiene interventions with sustained impact, it is necessary to better understand what triggers and supports people to sustain hygiene behaviours. In this evaluation, people identified changes the WASH project had brought to their villages, and described the drivers and barriers to sustained hygiene behaviour change. The successes of the intervention are in large because it addressed multiple barriers and drivers of behaviour change, from the structural to the individual/habitual level. In addition to technological dimensions (i.e. provision of partially subsidised water/sanitation ‘hardware’), the intervention established and renewed community groups (e.g. women’s groups, Junior Red Cross Circles, children’s clubs) which provided a site via which to both deliver hygiene promotion and to generate local responsibility for hygiene promotion. Hygiene messaging focused not only on health and illness, but also the creation of social norms and civic pride around WASH conditions and declaration of Open Defecation Free (ODF) status. Triggering tools (e.g. faeces calculations) tapped into emotional drivers of behaviour change such as disgust, shame, and desire to nurture and protect. Conditions were established that encouraged habitual hygiene behaviours, including ease of access to wat/san facilities and visible presence of hygiene messages in wards (e.g. steps for handwashing).
The presence of **local NRCS volunteers** in the District Chapter and sub-chapters was also central to the implementation and success of the project, providing opportunity to build on existing practices, skills and relationships in Kotgaun VDC. The volunteers helped to ensure that activities were context specific and culturally compelling (e.g. street drama, healthy baby competitions). NRCS volunteers were able to initially target those most receptive to change, and then move to other wards as momentum was created. NRCS volunteers are part of the community, and they provided peer-support and influenced social norms, triggering hygiene behaviour change in homes and villages. The presence of NRCS volunteers provided continuity by having a district chapter and sub-chapters that were present and well-connected pre-, during and after the project. Further, the project provided a supportive environment for the development of leadership roles among key NRCS volunteers, which encouraged local responsibility for sustaining hygiene behaviour change. This highlights the value of development efforts in which local volunteers work together with other players – e.g. local government, IFRC, NRCS staff, community members – to achieve progress in complex situations.

Key **reported barriers** to sustained hygiene behaviour change included: sense of exclusion from project activities among some disadvantaged community members (e.g. Dalit households); lack of post-project momentum around hygiene behaviour change education/awareness-raising, due in part to the lack of clarity regarding the structures and institutions responsible for ongoing hygiene promotion; the cost of constructing sanitation hardware (e.g. latrines) in the post-project phase, without access to partial subsidy; and periodic water shortages from new/renovated water schemes associated with climate and rainfall variability, seasonal changes, deforestation, maintenance problems, and inter-ward tensions.

**In sum**, in complex public health promotion programmes the precise effects of intervention activities are difficult to identify; this is the case with the Rolpa project. This evaluation indicates that there were multiple contributing factors to hygiene behaviour change, including: (partially-subsidised) construction of sanitation hardware; renovation and construction of water schemes; the contribution and engagement of NRCS staff and volunteers; and, use of hygiene behaviour change messaging that links to diverse drivers of hygiene behaviour, from the habitual to the community and structural level. Importantly, health messaging was only one of a broad suite of triggers for hygiene behaviour change: effective triggers also included activities/messages with a focus on emotional drivers (disgust, nurture, and affiliation), creation of new norms, and elevation of civic pride related to personal and environmental cleanliness. These findings are consistent with broader literature relating to models of behaviour change. Specifically, the Integrated Behavioural Model for Water, Sanitation and Hygiene (IBM-WASH) makes explicit the diverse drivers and barriers of hygiene behaviour, from the societal/structural to the individual/habitual and highlights the broader context, psychosocial factors and ‘hardware/technology’ factors in which behaviour change interventions occur (see Dreibelbis et al. 2013). It is the holistic and multi-layered nature of the intervention that appears to have been central to its successes.
RECOMMENDATIONS FOR FUTURE WASH PROJECTS

NETWORKS/COLLABORATION/COMMUNITY ENGAGEMENT

1. Future NRCS WASH interventions could learn from the experiences gained in the Rolpa-based project. It is recommended that NRCS Volunteers and project staff in new project sites (e.g. Bajhang) make exchange visits with staff involved in the Rolpa project to facilitate learning.

2. Red Cross Volunteers: Continue and enhance strategies to attract and retain Red Cross volunteers who have the capacity to work closely with local communities and support Red Cross/Red Crescent project implementation and management.

3. Place emphasis on engagement and coordination with government at all levels, particularly with government at the DDC and VDC levels. VDCs should be encouraged to form WASH coordination committees where they do not already operate. Engagement with other agencies and actors in project sites is also critical to supporting post-project sustainability of hygiene behaviours.

HARDWARE

4. Water supply needs to be assured in order to support hygiene behaviours. At the project initiation phase holistic participatory assessment that includes examination of community politics/inter-ward tensions can assist to identity local challenges relating to water supply and distribution. NRCS could implement activities to support increased clarity regarding roles and responsibilities for the decentralised system for rural water supply.

5. Toilet design and use must be suitable in contexts of water shortages. Whilst pour-flush latrines appear to be preferred to improved pit latrines, future sustainability is a critical issue: including awareness-raising about potential in the region for climate change-related water variability is recommended. The main focus during dry periods should be on maintaining HWWS and recycling household grey-water for pour-flush toilets.

6. As per Nepal Ministry of Education Standards, in areas where other WASH funding is not available or forthcoming, projects should include WASH programmes in Schools.

7. Material incentives/partial subsidies for toilets appear to be effective, particularly in terms of ensuring poor people have access to high quality latrines. The 2011 Nepal Sanitation and Hygiene Master Plan, however, promotes a non-subsidy approach for the sanitation sector. If a non-subsidy approach is selected, it is critical to ensure there is a mechanism in place (e.g. sanitation savings groups within CBOs) that can support poor households to install a latrine and to ensure ongoing latrine construction after the achievement of ODF status.
HYGIENE PROMOTION

8. Inter-personal communication and group dynamics appear central to the promotion of hygiene and establishment of new social norms related to hygiene behaviour. Personal contact (e.g. Village Health Motivators), group meetings and hygiene classes, and community-based participatory activities are effective behaviour change methods to support individual, household and collective processes of hygiene behaviour change.

9. Triggering tools: shame and shock (e.g. fining for OD, flagging of OD, faeces calculation, transect walks) appear to have worked in this community to trigger a desire for improved WASH conditions. Evidence from other research, however, suggests that people will invest in sanitation and hygiene for more positive reasons than shame and shock, including comfort, security and prestige (see DFID 2013: 79). For example, triggering tools can focus on increasing civic pride at a community level (see also Recommendation 10).

10. Education for hygiene behaviour should focus not only on health messaging but on broader motivations of change: e.g. civic pride, disgust, affiliation and status. This recommendation is aligned with current models of behaviour change (e.g. Curtis et al. 2009; Dreibelbis et al. 2013), and is consistent with the findings discussed in this report. Some hygiene promotion methods that might be expected to be effective include:
   a. Civic pride: encourage community members to focus on the development of ‘healthy’ and ‘clean’ villages (as per the Government of Nepal post-ODF plan), not only household or individual-level benefits. Methods might include declaration of ODF status, but also other modes of recognising community-level transformations (e.g. clean village awards).
   b. Disgust: focus on poor hygiene as a source of contamination and trigger disgust. Methods might include faeces calculation, use of images of faecal matter, or visual media that present the idea of unseen contamination on hands after visiting the toilet. Disgust, however, has to be carefully handled so as not to ‘turn people off’ or further marginalise community members (e.g. Dalits) who face greater challenges in improving their hygiene behaviours.
   c. Affiliation: make community members feel that ‘everyone is doing it’. Methods might include public pledges to wash hands with soap, that specify both when and how to do HWWS, or ‘buddy systems’ in schools that help children remind each other about HWWS. It is important not to focus on low rates of particular hygiene behaviours as this can drive rates further down (see Curtis 2010).

Well-tailored and appropriate hygiene promotion, however, require formative research and community engagement to understand motivators of hygiene behaviours in specific project sites (see Recommendation 18 below)

11. Focus on development of habit and daily routine around hygiene behaviours:
   a. Habit is most readily formed at a young age, and families can be enlisted to help their children form good hygiene habits and develop ‘good manners’ (while inadvertently learning themselves).
b. Hygiene promotion can be presented in a way that supports the development of everyday habits around HWWS, latrine use and safe disposal of human excreta, safe water handling, and water use for personal hygiene purposes (e.g. systematic steps to handwashing, routines for safe-water handling).

c. Water and sanitation ‘hardware’ should be installed with a view to supporting the development of good hygiene habits. For example, easy-to-use and locally appropriate handwashing stations (e.g. simple designs that use locally available products or waste materials such as plastic bottles) could be an integrated part of latrine construction (see Curtis 2010).

12. ODF declaration appears to be a significant source of community pride. Signs that declare a ward’s ODF status should be prominently maintained in good condition.

13. Key hygiene behaviour change messages should be reinforced in the post-project implementation period, including handwashing with soap and safe-water handling.
   a. The MOHP Female Community Health Volunteers (FCHV) could be better linked with Village Health Motivators (remunerated by Red Cross projects), which could provide motivation for ongoing hygiene behaviour change education by MOHP FCHVs in the post-project phase.
   b. It could be advisable to employ one Village Health Motivator per ward during project phases in order to benefit from their inclination to continue informally with longer-term hygiene promotion in their own communities.
   c. Post-project reinforcement of hygiene promotion could be timed to coincide with times of high health risk, such as the beginning of the rainy season when diarrhoea and acute respiratory infections often peak. Local health facilities and FCHVs could work toward this recommendation.

14. Women are key organisers and caregivers in the Nepalese household, and it is critical to include and educate women as hygiene promoters. However, hygiene promotion with women does not necessarily change the hygiene behaviours of men. Men should be further involved in hygiene promotion, with tailored topics and approaches. Involvement of male leaders and male Village Health Motivators could be a mechanism to support men’s inclusion.

15. Reaching poorest segments of society: if hardware subsidies are minimised or not available, toilet design must be available that is affordable to low-income, poor and ultra-poor groups. Active targeting and inclusion of poorest segments in hygiene promotion efforts is essential.

16. Involvement of children: children can play a key role as change agents in their communities. It is recommended that children are included both in hygiene education approaches, and that they are encouraged to disseminate and support improved hygiene behaviours within their families and wider communities.
17. Involvement of women: women’s groups are effective sites for hygiene promotion, creation of social norms and sense of affiliation, and development of savings/credit groups that can support WASH infrastructure and livelihood development.

M&E AND RESEARCH

18. Research in project sites: this project illustrates that adjustment of a project to take account of local conditions and needs ensures better outcomes.
   a. Formative research in new project sites can provide important insights about local motivations and barriers to hygiene behaviours, test media and hygiene education message with target groups, and determine how best to encourage people to adopt improved hygiene behaviours. For example, Curtis et al. (1997) reviewed 11 formative research studies that explored hygiene motivations using a range of qualitative and quantitative methods: one method was showing people pictures that depicted potential motives for handwashing and then probing for core motivations (e.g. nurture, disgust, affiliation, status). These types of formative research methods could be applied in project sites.
   b. Action research could be used to test and better understand assumptions about how to sustain hygiene behaviour change (i.e. deliberatively try innovative approaches).

19. Build on existing monitoring and evaluation processes, including through in-depth feedback from community members. Training on data collection (e.g. for baseline surveys) should be provided to data collectors to increase its reliability. Some key outcome measures require careful review; for example, handwashing data should include structured observation of handwashing, not just self-reported rates.
INTRODUCTION AND BACKGROUND
Since 1990, almost 2 billion people globally have gained access to improved sanitation\(^7\), and 2.3 billion have gained access to safe drinking-water from improved sources\(^8\). The MDG target of halving the proportion of people without access to safe drinking water has been met (see Fig 1). Despite this progress, there are persistent geographic, socio-cultural and economic inequalities in access to improved drinking water and sanitation facilities (WHO/UNICEF JMP, 2014). In 2011 an estimated 768 million people worldwide still lacked access to safe water, so efforts must continue in water provision. And access to sanitation remains a significant challenge for many countries, with an estimated 2.5 billion people lacking adequate sanitation facilities – many of whom still practice open defecation. In 2004, WHO reported that lack of sanitation, contaminated water and poor hygiene practices contributed to almost 90 per cent of deaths from diarrhoeal diseases (WHO, 2004).

The International Federation of the Red Cross and Red Crescent Societies (IFRC) support the implementation of Water, Sanitation and Hygiene Promotion projects within the framework of the Red Cross Red Crescent Global Water and Sanitation Initiative (GWSI). The GWSI aims to improve access to safe water and adequate sanitation, as well as supporting the application of good hygiene practices and community water management. It seeks to establish large-scale, long-term, equitable and sustainable water and sanitation programmes through the work of National Red Cross Red Crescent Societies, and is founded on participatory approaches. Over the past ten years, the IFRC and its members have significantly scaled-up delivery of water and sanitation programmes in order to help improve the health and quality of life of vulnerable communities (IFRC 2015).

SANITATION AND WATER: LET’S GET THE BALANCE RIGHT

Figure 1: MDG Water and Sanitation Targets/IFRC efforts (Source: IFRC 2015)

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\(^7\) An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. It includes flush/pour-flush toilets, ventilated improved pit (VIP) latrine, pit latrine with slab, composting toilets (WHO/UNICEF 2014).

\(^8\) An improved drinking-water source is constructed to adequately protect the source from outside contamination, in particular from faecal matter (WHO/UNICEF 2014).
Nepal: overview
Nepal, officially the Federal Democratic Republic of Nepal, is located in South Asia. It is a small landlocked country bordered by China’s Tibet Autonomous Region and India. Based on projections, it is estimated that Nepal has a population of 28.4 million as of 2015 (UNPD 2012). The major language is Nepali. However, there are 60 or more ethnic and caste groups and up to 100 other languages are spoken. Hinduism and Buddhism are the major religions, and Christianity, Islam, Kirat and others are also practiced. Nepal is divided into three main geographical regions: Himalayan mountain region, mid hill region and the terai (plain) region (UNDP 2014). The country has five administrative development regions (Eastern, Central, Western, Mid-Western and Far-Western), 75 administrative districts, and nearly four thousand rural Village Development Committees (VDCs) and urban municipalities (UNDP 2014).

Nepal is classified as a least developed country (with a country ranking of 145/179 in the UNDP 2014 World Development Report), and experiences persistent social inequalities and poverty (UNDP 2014). In 2011, the Human Development Index (HDI) score for Nepal was 0.458, the lowest among SAARC country other than Afghanistan (UNDP 2014). Nepal has a per capita GDP of USD377. Approximately one quarter of the population are estimated to live below the poverty line, and the Gini coefficient (which indicates level of equality of income distribution) is 0.328.9

Nepal experiences pronounced inequalities in human development by caste and ethnicity (as noted in the first Nepal Human Development Report in 1998), although there is some evidence they may be reducing (UNDP 2014). Gender equality has been recognized by the Government of Nepal and its development partners as critical to equitable development, yet women experience persistent disadvantage (ADB 2012).

Table 1: Key demographic statistics for Nepal, 2011 Preliminary Figures

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<tbody>
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<td>- Female</td>
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<td>- Urban</td>
<td>4,525,787</td>
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<tr>
<td>- Mountain</td>
<td>1,795,354</td>
</tr>
<tr>
<td>- Hill</td>
<td>11,475,001</td>
</tr>
<tr>
<td>- Terai</td>
<td>13,350,454</td>
</tr>
<tr>
<td>Number of households</td>
<td>5,659,984</td>
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<td>Crude Birth Date</td>
<td>24.3, per 1,000 population</td>
</tr>
<tr>
<td>Average Life Expectancy</td>
<td>64.1 years (male 63.6; female 64.5)</td>
</tr>
</tbody>
</table>
| Literacy rate            | Female: 42.8%  
                          | Male: 65.5%  |

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9 The Gini coefficient represents a nation’s income distribution. It is a number between 0 and 1, where 0 represents perfect equality (everyone has the same income) and 1 represents perfect inequality (one person has all the nation’s income).
WASH in Nepal
The Nepal targets under the Millennium Development Goals (MDGs) are to provide 86% of the population with access to an improved drinking water source and 53% with access to improved sanitation by 2015. In 2012, national statistics indicated that 88% of households had access to safe water supply (via water piped onto premises and other improved sources) and 37% had access to improved toilet facilities (see Tables 2 and 3) (WHO/UNICEF JMP 2014). Nepal has seen significant progress in water and sanitation coverage, yet it has the lowest sanitation coverage in the South Asia Region (NRCS WASH Division 2012). Poor and disadvantaged communities, particularly in rural and remote areas, have the lowest rates of water and sanitation coverage. Solid waste and wastewater management are problematic in urban areas (Nepal Government, 2068).

Table 2: Drinking water coverage estimates in Nepal

<table>
<thead>
<tr>
<th>Nepal</th>
<th>Drinking water coverage estimates</th>
<th></th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban (%)</td>
<td>Rural (%)</td>
<td></td>
</tr>
<tr>
<td>Piped onto premises</td>
<td>46</td>
<td>2</td>
<td>49</td>
</tr>
<tr>
<td>Other improved source</td>
<td>51</td>
<td>61</td>
<td>41</td>
</tr>
<tr>
<td>Other unimproved</td>
<td>2</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>Surface water</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: WHO/UNICEF JMP, 2014

Table 3: Sanitation coverage estimates in Nepal

<table>
<thead>
<tr>
<th>Nepal</th>
<th>Sanitation coverage estimates</th>
<th></th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban (%)</td>
<td>Rural (%)</td>
<td></td>
</tr>
<tr>
<td>Improved facilities</td>
<td>34</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>Shared facilities</td>
<td>25</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>Other unimproved</td>
<td>8</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Open defecation</td>
<td>33</td>
<td>9</td>
<td>91</td>
</tr>
</tbody>
</table>

Source: WHO/UNICEF JMP, 2014

Water, sanitation and hygiene present challenges to population health in Nepal; an estimated 70% of communicable disease-related deaths and 9% of all deaths are attributable to water, sanitation and hygiene (WHO 2004). In 2004, WHO estimated that there were 17,700 deaths in Nepal due to water supply, sanitation and hygiene, which is higher than numbers cited in government sources (12,700 in 2010) (ITS-UFS 2011; WHO 2004). Diarrhoea is the second highest cause of death among children under-five years in Nepal, and rates increase in areas with poor sanitation coverage and inadequate handwashing practices (ISF-UTS 2011). Approximately NPR5.8 billion is spent on health expenditures for water and sanitation-related diseases per year (Nepal Government 2068).

The endorsement in 2011 of the ‘National Sanitation and Hygiene Master Plan’ has been instrumental to setting up national sanitation targets and creating momentum within the WASH sector. A key target is to end open defecation and achieve universal toilet coverage by 2017. In 2011, the improved sanitation coverage reached 62%, but this coverage is unevenly distributed across regions and between rural–urban areas (Government of Nepal 2013). The Master Plan has four phases: institutional building at the national, regional, district and municipality levels; planning,
programming and development of hygiene and sanitation promotion budgets; ODF campaigns and behaviour change using the ‘ignition and wider sensitization tools’; and the post-ODF phase which includes monitoring, upgrading of toilets and an emphasis on handwashing, waste management and water and food hygiene. The Village Development Committees and municipalities that have achieved open defecation free (ODF) status are recognised by an award (Steering Committee for National Sanitation Action 2011). As of September 2014, 1671 VDCs and 18 municipalities had been declared ODF areas. Fifteen of Nepal’s 75 districts had been declared ODF districts (http://www.wash-rcnn.net.np/nwa/odf-updates.html).

The WASH sector in Nepal, however, remains problematic: there are problems of coordination among key government agencies and local bodies, overlaps in responsibilities, lack of institutional support, a reliance on capital funding from government and international donors, an emphasis on project-oriented approaches to WASH delivery, a preference for building new schemes rather than repairing and maintaining existing ones, poor support for water and sanitation committees in relation to technical and managerial skills, and problems when handing over responsibility for completed projects ((Government of Nepal 2013; IFS-UTS 2011). Top-down approaches have led to exclusion of the voices of poor rural and remote communities in WASH sector programming. The recent Nepal WASH sector status report found large gaps existed between the national water, sanitation and hygiene policies and their implementation (Government of Nepal 2013).

Rolpa District
Rolpa is in the remote mid-Western region and is composed of mid and high hills with sloped terrain (see Fig 2). It comprises 51 VDCs. In 2011 Rolpa had an estimated population of 224,506 people, 54% of whom were women due to high rates of seasonal and labour migration particularly among young men. It has a low development status relative to other Nepali districts, with approximately 46.5% of people living below the poverty line (UNDP 2014). Most VDCs are connected with the road network, though some are not accessible by road during the monsoon season (June-August) (UNFCO 2013). The majority of people in Rolpa are Hindu (85%), 12% are Buddhist and 1.7% Christian. Predominant caste groups in Rolpa include Hill Jana (Magar), Chhetri and Dalit10 (UNFCO 2013). Rolpa was a key site for Maoist activity during Nepal’s decade long conflict (see Annex 1). Public health services are limited and of poor standard and there are limited health personnel (UNFCO 2013).

| Table 4: Key demographic and development indicators for Rolpa |
|-----------------|-----------------|
| Total VDCs      | 51              |
| Population (2011)| 224,506 (Female 121,406; Male 103,100) |
| Total households| 43,735          |
| Average household size| 5.13          |
| Human Development Index| 0.395        |
| Literacy rate   | 60% (women’s literacy rate 50%) |
| Foreign aid disbursement per capita| USD 38       |
| Households with mobile phones| 48%            |
| Health services | 1 hospital; 2 primary health centres; 49 health posts/sub-health posts |

Source: UNDP 2014; UNDP 2013

10 The caste system continues traditional systems of social stratification. The Hill Hindu groups include high caste groups (e.g. Chhetri), middle caste groups (e.g. Sanyasi), and low-caste groups/dalits (e.g. Sarki).
NRCS and Rolpa District Project
NRCS, in partnership with Austrian Red Cross/Austrian Development Corporation, implemented a water, sanitation and hygiene project in Kotgaun Village Development Committee (VDC) in Rolpa District from August 2008 to February 2012. Kotgaun VDC is one of the 51 VDCs in Rolpa district. It has nine wards, and (at the time of project initiation) a population of approximately 4,785 people living in 878 households (Graf 2011; NRCS WASH Division 2012). A key objective of the project was to improve the health status of people in Kotgaun VDC by reducing water and sanitation-related diseases, and to increase the overall wat/san capacity of the NRCS District Chapter.

The central expected results of the project were:

1. Improved health and hygiene related knowledge and behaviour in target communities;
2. Sustainable access to safe drinking water, latrines and sanitation facilities in households and schools;
3. Increased capacity of NRCS Rolpa to carry out development projects and strengthened capabilities of targeted communities to sustain project outputs;
4. Empowerment and improved social status of women;
5. Documentation and dissemination of lessons learnt and findings within NRCS and among other stakeholders.

Figure 2: HDI values across districts in Nepal, 2011 (Source: UNDP 2014)
The evaluative project presented in this report focused specifically on sustained hygiene behaviours, with **key indicators** of project effectiveness (as identified as Expected Results in project documents) including:

- improved handwashing practice with soap or ash
- improved household waste management
- safe water handling in households
- access to and use of latrines
- access to and use of garbage pits
- access to and use of washing platforms

Activities to support hygiene behaviour change in the target communities included: provision of hardware (toilets, handwashing platforms etc.), group/committee formation (e.g. junior/youth Red Cross circles, women’s groups, water user committees), health and sanitation education activities, health hygiene and sanitation education campaigns and awareness raising, sanitation message display boards, street drama, handwashing training and demonstration for schoolchildren and community, home visits in households, events and days (handwashing day etc.), development and production of hygiene and sanitation IEC materials, and WASH campaigns to include women and under-privileged people. These activities were co-ordinated and implemented through NRCS in partnership with Austrian Red Cross/Austrian Development Corporation.
DETERMINANTS OF HYGIENE BEHAVIOUR CHANGE: Literature review

Theoretical models of hygiene behaviour change

Behaviour change is the ‘holy grail’ of health promotion and is central to the prevention of many persistent and critical population health concerns (Aunger and Curtis, 2007; Langford and Panter-Brick 2013). However, behaviour change is both difficult to initiate and sustain, even where communities are informed about health risks and simple means of health risk reduction.

In resource poor settings, a key strategy for reducing diarrhoeal disease and other WASH-related illness is hygiene behaviour change interventions, often in combination with provision or promotion of low-cost water, sanitation, and hygiene (WASH) technologies. In order to achieve significant improvements in population health, WASH-related behaviours and technologies must be adopted and maintained over time and at scale. So, what are the barriers and drivers for adoption of improved WASH-related behaviours?

Health-related behaviour can be influenced in many ways: people can be provided with reminders, health messages, role models, services, skills, changed physical environments (e.g. products, facilities), changed social environments (e.g. formation of community-health clubs), provision of material/financial incentives, or they can be coerced through threat of punishment and the power of social institutions (Aunger and Curtis 2007).

Several theoretical models and frameworks have been developed that seek to identify key drivers and barriers of improved WASH-related behaviours. However, they differ in scope and focus: some address specific behaviours (e.g. handwashing with soap, household water treatment, diarrhoeal prevention) and others focus more generally on WASH practices; some focus on individual-level factors that influence behaviour and others have a broad ecological approach that examine the individual, community, environmental and policy levels (Aunger et al. 2010; Coombes and Devine 2010; Curtis et al. 2009; Devine 2009; Figueroa and Kincaid 2010; Mosler 2012). For example, Mosler (2012) presents a model for hygiene behaviour change that focuses on psychological determinants of health such as attitude, sense of risk and self-regulation. Curtis et al. (2009) highlight the importance of habit and emotional drivers (e.g. disgust, affiliation, nurture) for sustained handwashing (see also Curtis et al. 2011; Aunger and Curtis 2007). And Figueroa and Kincaid (2010) focus on effective models of communication for encouraging water treatment and safe storage behaviour (see Annex 2 for further detail).

Dreibelbis et al. (2013) state, however, that in most theoretical models of WASH behaviour change the types of wat/san intervention linked to behaviour change are under-represented, contextual factors (e.g. gender, socio-economic status) are obscured, most focus largely on individual-level factors rather than broader structures and social ecology, attributes and characteristics of WASH behaviours are rarely considered, and factors related to formation of habits are rarely addressed.

Based on a systematic review of published articles and grey literature relating to WASH behaviour change models and frameworks, Dreibelbis et al. (2013) developed a comprehensive framework for examining the behavioural determinants of WASH practices in order to inform intervention development and scholarly discussion: The Integrated Behavioural Model for Water, Sanitation and
Hygiene (IBM-WASH) (see Table 5). The IBM-WASH model presents a synthesis of existing WASH-related behavioural models within an ecological framework. It identifies three dimensions (columns) that influence behaviour change and adoption of new technologies/practices: Contextual Factors (e.g. access to water and soap), Psychosocial Factors (e.g. shared values, shame associated with undesirable behaviours, perceived disease risks), and Technological Factors (e.g. availability of physical hardware, convenience of hardware). Each of these dimensions function at five levels (rows): habitual, individual, interpersonal/household, community, society/structural. This report uses the IBM-WASH model to guide data analysis. It provides a detailed explanatory framework that synthesises a body of theory around WASH behaviour change and maintenance without predetermined assessment of which factors are the most critical.

### Table 5: The Integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH)

<table>
<thead>
<tr>
<th>Levels</th>
<th>Contextual factors</th>
<th>Psychosocial factors</th>
<th>Technology factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Societal/Structural</td>
<td>Policy and regulations, climate and geography</td>
<td>Leadership/advocacy, cultural identity</td>
<td>Manufacturing, financing, and distribution of product; national policies, promotion of products</td>
</tr>
<tr>
<td>Community</td>
<td>Access to markets, access to resources, built and physical environment</td>
<td>Shared values, collective efficacy, social integration, stigma</td>
<td>Location, access, availability, individual vs. collective ownership, maintenance of product</td>
</tr>
<tr>
<td>Interpersonal/Household</td>
<td>Roles and responsibilities, household structure, division of labour, available space</td>
<td>Injunctive norms, descriptive norms, aspirations, shame, nurture</td>
<td>Sharing of access to product, modelling/demonstration of use of product</td>
</tr>
<tr>
<td>Individual</td>
<td>Wealth, age, education, gender, livelihoods &amp; employment</td>
<td>Self-efficacy, knowledge, disgust, perceived threat</td>
<td>Perceived cost, value, convenience, and other strengths and weaknesses of the product</td>
</tr>
<tr>
<td>Habitual</td>
<td>Favourable environment for habit formation, barriers to repetition of behaviour</td>
<td>Existing water and sanitation habits, outcome expectations</td>
<td>Ease/Effectiveness of routine use of product</td>
</tr>
</tbody>
</table>

Source: Dreibelbis et al. (2013)

### Approaches to hygiene behaviour change intervention

A number of reviews have examined the elements for success for health behaviour change interventions, and indicate that interventions should be informed by theoretical models of behaviour change, based on a rigorous evidence-base, have in-depth understanding of the target population, be able to adapt to local settings, use a culturally compelling (not just culturally appropriate) design, build upon local practices, skills and priorities, and feature community mobilisation (Aboud and Singla 2012; Aunger and Curtis 2007; Higginbotham et al. 2001; Mosler 2012). There are multiple approaches to hygiene and sanitation software interventions that seek to change hygiene behaviours. Recent reviews have summarised and identified evidence of effectiveness of these approaches (see Peal et al. 2010; DFID 2013). However, there is limited reliable testing of the effectiveness of behavioural interventions (Mosler 2012). IFRC uses software approaches to hygiene promotion – e.g. local capacity-building, stakeholder involvement, and encouraging behavioural change - in order to ensure that water and sanitation systems deliver effective and sustainable health and social benefits (IFRC 2007). Their software
component includes: (1) community management of hardware and engineering installations; and (2) health and hygiene behaviour promotion.

IFRC have developed a framework for health programs that seek to achieve behaviour change (e.g. handwashing, breastfeeding, immunizations, consistent condom use, use of bed-nets). It is intended to be reviewed and modified iteratively in response to new knowledge, theories, experiences and technologies (see Claxton 2012). The process for applying the behaviour change framework includes: 1) needs assessment (define the problem); 2) identify determinants of unhealthy behaviours at the individual, interpersonal, environmental, community, organizational, and societal level; 3) identify options (explanations) for changing unhealthy behaviours; 4) develop program; 5) monitor and evaluate (see Figure 3).

\[\text{Figure 3: IFRC Behaviour Change Framework (Source: Claxton 2012, p. 18)}\]

Nepal Red Cross Society uses a combination of Community Led Total Sanitation (CLTS), School Led Total Sanitation (SLTS) and Participatory Hygiene and Sanitation Transformation (PHAST) approaches to hygiene behaviour promotion. These approaches allow communities to identify their own sanitation and water supply problems, with a view to developing solutions that are sustainable and culturally and technologically appropriate (IFRC 2015). In their ‘pure’ form:

- **Community Led Total Sanitation (CLTS)** aims to eliminate open defecation through collective local action (Kar 2012: 95). Various tools are used to raise awareness of the risk that open defecation presents to community members, to generate a sense of disgust and shame, and to trigger a demand for latrines. These include transect walks (“walk of shame”), community mapping, visits to sites of open defecation, group discussions, and faeces calculations to
estimate how much ‘shit’ is produced and circulating in the community. This forms the foundation for community-led plans to improve sanitation. As no subsidies are provided by institutions implementing pure CLTS, a community may consider taking out loans for the construction of latrines or providing subsidisation for poorer members (Peal, Evans and van der Voorden 2010; Mehta 2010). Intervention sites indicate that CLTS has resulted in a very large uptake in latrine construction and use. However, since it is a relatively new approach there is limited evidence relating to the impact of CLTS on behaviour change in the longer term, or to confirm impacts on health (Peal, Evans and van der Voorden 2010).

- Community-Led Basic Sanitation for All (CLBSA) is a modified approach to CLTS that utilises a two-step process: once a community has achieved elimination of open defecation, a community fund is established to assist the least able to upgrade and build permanent toilets.

- School Led Total Sanitation (SLTS) uses similar participatory exercises and hygiene education to CLTS, but engages with school children. It is premised on the understanding that children are open to new learning, can readily adopt new hygiene practices, and have the ability to bring about behaviour change in their communities (Peal, Evans and van der Voorden 2010). School children, however, are not always representative of their communities, as poorer and excluded groups may not send their children to school. This could lead to a lack of real participation and ownership by all target groups (WaterAid/ADB 2008). There is no published evidence of effectiveness for the STLS approach (Peal, Evans and van der Voorden 2010).

- Participatory hygiene and sanitation transformation (PHAST) is a ‘seven step’ participatory approach: (1) problem identification, (2) problem analysis, (3) planning for solutions, (4) selecting the technology options and, (5) the management system of those facilities, (6) monitoring and (7) evaluation (see Figure 5). It builds on people’s ability to address and resolve their own problems, promotes health awareness, and aims to empower communities to manage their water and control sanitation-related diseases. A key strategy of PHAST is helping people to rationally perceive the risk of adverse health consequences associated with poor sanitation conditions and hygiene practices. The PHAST approach seeks to build trust, capacity and establish a dialogue between engineers and the community (IFRC 2007). Recent evidence (from Tanzania), however, suggests that while PHAST is effective at conveying key health messages it is less effective at supporting sustained hygiene behaviour change, particularly on a large scale (Curtis et al. 2011: 316). The Red Cross movement recommends that PHAST approaches take into account social, cultural and traditional norms that might be additional motivations for behavioural change (Gonzalez et al. 2010).
Nepal Red Cross Society has made systematic efforts to improve water and sanitation coverage since 1983. It has contributed to achieving around 16% of total national WASH goals in Nepal. The NRCS WASH division are a focal point that coordinates overall WASH activities. Since 1988, NRCS has initiated and emphasised software interventions for water and sanitation and hygiene behaviour change. NRCS utilises aspects of PHAST, CLTS and SLTS (see above). For example, it utilises some of the triggering tools that emerge from the CLTS approach with a view to igniting community demand for latrines and improved hygiene, yet provides hardware subsidies for latrine construction (for ultra-poor, single female-headed households, people with disabilities and Dalit households) and draws on PHAST as a follow up approach (NRCS WASH Division 2012). This strategy of adapting and utilising different components of various hygiene behaviour change models is aligned with current thinking in development practice that focuses on problem-driven adaptation and flexibility (see for example Andrews et al. 2012). While models for hygiene behaviour provide potential solutions, a problem-driven focus shies away from imposing pre-defined solutions. Problem-driven interventions seek to allow for novelty and flexibility and local input into actions that can be meaningfully pursued in the search for solutions (Andrews et al. 2012). Rather than identifying ‘best practice’ solutions, potential interventions must be adapted in order to address the complexity of real problems and identify technically viable solutions to locally perceived and experienced problems (Andrews et al. 2012). The selective use and adaption of existing hygiene behaviour change models can be understood as a key strength in the NRCS WASH division activities.
RESEARCH METHODS

This evaluative research was conducted during October 30–November 18, 2014 in Rolpa district, in the remote and mid-Western region of Nepal. Kotgaun VDC was the primary field site (where Austrian Red Cross and NRCS implemented a WASH project from August 2008–February 2012). Residents of eight of the nine wards of Kotgaun VDC were included (see Annex 2: research team and research schedule). Ward 9 was not visited as it was inaccessible on the day of scheduled visit. The Rolpa NRCS District Chapter supported the research process, communicating with ward members and assisting to set up focus group discussions.

Previous evaluations of the Kotgaun VDC WASH project primarily used quantitative approaches, and analysed data to provide evidence of impact in relation to key expected results (Acharya and Devkota 2012; Gonzalez et al. 2013; Graf et al. 2011; NRCS WASH Division 2012). The results of these evaluations, where relevant, are referred to in this report.

The purpose of this evaluation was to look in-depth at the drivers and obstacles to hygiene behaviour change, with a focus on local perspectives. Participatory methods, in-depth interviews and focus group discussions were central to generating rich qualitative data. Key methods included:

1. Focus group discussion (N=13 groups: 7 male groups, 6 female groups) to examine: local perceptions of hygiene behaviour and health; obstacles/motivators to behaviour change; impact of project; engagement with Red Cross volunteers and other stakeholders.

2. Individual in-depth interviews (N=29) to examine: local attitudes toward hygiene behaviours; perception of links between hygiene behaviours and health; self-reported hygiene behaviours; motivators/obstacles to hygiene behaviour change.

3. ‘Most significant change’ method (N=16): a qualitative and participatory technique involving the collaborative preparation of stories of significant change. The process offers an opportunity for participants to discuss program intention and impact on longer term hygiene behaviour change.

4. Key informant interviews (N=12) to examine: strengths/challenges of project approaches; perceived obstacles/motivators to behaviour change; role of local Red Cross chapter/sub-chapter; impact of socio-cultural and environmental context on sustained hygiene behaviour change. Key informants included NRCS District Chapter/Sub-Chapter volunteers, members of the Water User Committees, Female Village Health Motivators, Female Community Health Volunteers, District Public Health Office and Health Post workers.

5. Direct observation of households to examine: handwashing facilities, toilets, household hygiene, water facilities, waste management, and management of animals.

6. Analysis of data collected from local health facilities to identify key health and hygiene indicators, specifically treatment of childhood diarrhoeal disease.
Research tools were developed based on careful review of WASH literature and research, and these were further refined in Kathmandu in partnership with the NRCS M&E officer.

112 people participated in the research (see Table 6). Participants were selected from eight of the nine wards in Kotgaun VDC, and they ranged in age (10-78 years of age), sex (57 male, 55 female), and caste groups (Mogur, Chhetri, Dalit). Households were approached that were both in accessible (e.g. by the road-side) and less accessible (e.g. across fields) locations. Group discussions were organised with the support of the Nepal Red Cross District Chapter and Sub-Chapter, or occurred spontaneously where a group of people had gathered for other purposes but indicated willingness to participate. Interviews and group discussions were digitally audio-recorded and transcribed verbatim. Informed verbal consent was obtained from all participants. The large majority of interviews and group discussions were conducted with the assistance of two interpreters (one male, one female).

Table 6: Method and participant summary

<table>
<thead>
<tr>
<th>METHOD</th>
<th>NUMBER OF PARTICIPANTS</th>
<th>SEX</th>
<th>AGE RANGE IN YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual in-depth interviews</td>
<td>29</td>
<td>10 male</td>
<td>16-65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19 female</td>
<td></td>
</tr>
<tr>
<td>Focus Group Discussions (FGDs)</td>
<td>71 (13 groups)</td>
<td>38 male</td>
<td>10-78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33 female</td>
<td></td>
</tr>
<tr>
<td>Key Informant (KI) interviews</td>
<td>12</td>
<td>9 male</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 female</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>112</td>
<td>57 male</td>
<td>10-78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>55 female</td>
<td></td>
</tr>
<tr>
<td>Most Significant Change</td>
<td>16 stories (collected from FGDs)</td>
<td>-</td>
<td>As per FGDs</td>
</tr>
<tr>
<td>Household observation</td>
<td>Approximately 180</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The analysis followed standard qualitative methodologies of thematic ordering and interpretation to identify key drivers and barriers to sustained hygiene behaviours. Factors represented in the IBM-WASH framework informed thematic coding of interview transcripts (Dreibelbis et al. 2013). The study protocol was reviewed and approved by the La Trobe University Human Ethics Committee and by Australian Red Cross.
FINDINGS

ARE HYGIENE BEHAVIOURS SUSTAINED?

We have not forgotten. If we wash hands it is good for our health and our life. To be clean and to be free from diseases, we continued for our health. (Women’s FGD)

Toilets

Very few households or schools in Kotgaun VDC had toilets prior to the project: the project baseline survey indicated that only 4% of households and no schools had a toilet (Gonzalez et al. 2013). During the project, 856 toilets were constructed with the majority being pour-flush latrines and a few dry-pit latrines:

At first there was a goal of building 400 toilets but later we realised if we wanted to declare ODF then we have to provide to all households, all 800. So that was a good opportunity. So we made all 800 toilets (NRCS volunteer, District Chapter).

The project achieved 100% coverage of toilets in households and schools. In 2011, Kotgaun VDC was declared an Open Defecation Free (ODF) village, with 100% of households having access to toilets.

Figure 5: Pour-flush latrine in Kotgaun VDC

Having a toilet only brings health benefits if good hygiene is implemented. Evidence from other studies indicate mixed results: some studies indicate that toilets have remained in use over time, others have found open defecation in communities that claim to be open defecation free, and at least one study (nine years post-intervention) found sustained use among females but halving of toilet use among men (Sijbesma 2010). In this evaluation, there were indications of sustained behavioural change around use of toilets. Approximately 90 household toilets were observed: all but three of the households visited had a toilet; all inspected toilets were clean (with toilet brush and toilet cleaner present in many latrines), well-maintained and evidently being used; all had a water
container for flushing/washing. Evidence of open defecation was only observed a few times. These observations were supported by the consistent narrative that “many people used to go to the toilet in the forest before, but now they are all using the toilet” (Men’s FGD).

Reported reasons for sustained use of toilets included: desire for increased environmental cleanliness, the civilised and modern nature of using toilets rather than open defecation, ease of access to toilets close to houses, being able to provide toileting facilities to guests, increased community pride, regulations associated with ODF-status, reduced flies/pests, establishment of toilet use as a social norm, and improved health.

As participants said:

Before we went to the toilet in the open area, or in the place where the pigs are and we went to the toilet near the pigs and give it to them. It feels good to have a toilet, and environmentally it is nice to have a toilet, because it is clean. (Shrijana, school girl, 16 years)

It’s so good because we have the toilet, we use the toilet, when guests arrive they use the toilet and we are happy now. It is so good compared to before. (Hari, male, 33 years)

Although the program has been finished, we are very aware about this and everyone practices it. Even if a child needs to defecate we don’t do it in an open place, we get plastic pan from the town and we use that for the defecation of children and throw it in the toilet and clean it. (Women’s FGD)

Handwashing

The final project report indicated that the majority of people (89%) were practicing improved handwashing with soap/ash and water at critical times (e.g. after going to the toilet, after work, after eating, before cooking) (85% 8%, target 80%) (NRCS WASH Division 2012). The look-back study, however, concluded that rates of handwashing had declined subsequent to the end of the project, suggesting that this hygiene behaviour has not been consistently sustained (Gonzalez et al. 2013). Closer examination of this data indicates that self-reported handwashing had apparently decreased for some key times (after finishing meal, after defecating/urinating, after cleaning children’s stools, before eating) and increased for other times (after finishing work, before cooking).11

Table 7: Handwashing indicators

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>After finished meal</td>
<td>77%</td>
<td>39%</td>
</tr>
<tr>
<td>After finishing work</td>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>After defecating/urinating</td>
<td>98%</td>
<td>44%</td>
</tr>
<tr>
<td>Before cooking</td>
<td>60%</td>
<td>77%</td>
</tr>
<tr>
<td>After cleaning children’s stools</td>
<td>48%</td>
<td>25%</td>
</tr>
<tr>
<td>Before eating</td>
<td>52%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Source: Gonzalez et al. (2013)

In this evaluation, all participants said they washed their hands regularly with water and either soap or ash:

11 Note that there are some concerns regarding the reliability of this data due to challenging conditions during the fieldwork.
Upper part of the home there is a pipe where we can wash our hands. We buy soap in places nearby here. We wash our hands with soap. (Anju, female, 22 years)

Figure 6: Woman washing hands, Kotgaun VDC

Most participants could name at least three key times for handwashing (see below). It is well-established that self-reporting is not an accurate indication of actual health behaviours, as participants may provide desirable answers based on their knowledge and attitudes rather than an account of their actual behaviours (reporting bias). Nonetheless, observations indicated houses had designated places to wash hands, typically entailing cement washing platform (many built with the assistance of Red Cross materials – cement, pipes, taps) with a water source and soap and/or ash paste. Several observed handwashing sites were simpler, such as a functioning water pipe with a jug and soap or ash paste on a clean rock nearby. Yet all observed houses had a handwashing site that was clearly being utilised: e.g. running spring water, wet soap, and wet platforms. People were observed washing hands both before and during interviews (if for example preparing a drink to share).

The drivers behind (self-reported) handwashing were diverse - from the structural/societal to the habitual - including the key role of Red Cross volunteers in providing education, to a sense of collective efficacy and shared values around cleanliness, to the adoption of new habits. These drivers are discussed in more detail below, but they point to the importance of holistic strategies for hygiene behaviour change that have a broader focus than health messaging.

Safe handling of water
The final report indicated that 84% of households practiced safe handling of water from source to point of use: collection, carrying, storing, distributing, and using (BS 12%, target 50%). The percentage of households, however, that boiled their water as the preferred option for water treatment declined from 96% at end-line to 34% at the look-back study (Gonzalez et al. 2013).
Anecdotal evidence from other districts in Nepal (i.e. Bajhang) indicates that water is boiled during cold seasons, for health and comfort, but during the hot monsoon season people prefer cold unboiled water. And, while 84% of households stored water in appropriate containers (clean and closed with lid) at the end-line survey, this had reduced to 63% at the time of the look-back study (Gonzalez et al. 2013).

In this evaluation, some participants spoke about methods for household water storage and treatment, including covering, boiling, filtering and using chlorine drops:

Water comes from the main streams high in the hill, these are collected in different reservoirs which are as big as house. The water is drinkable, also we boil the water to drink, even now. (Women’s FGD)

We put into a bucket two drops of water purifying drops, chlorine drops. Mostly in the monsoon period we do that, for every two and a half litres we use two drops. (Shrijana, school girl, 16 years)

In the houses the water is strained through a cloth; there is no need to clean the water further. (Men’s FGD)

Household water treatment was not widely mentioned, and several participants said the water is now ‘very clean’ and does not need to be treated. Water coming from a proven safe source (through regular testing, operation and maintenance) does not need to be treated if the safe water chain is followed. There may be a need, however, for ongoing campaigns relating to safe handling of water.

Environmental and Household Cleanliness

152 garbage pits and animal waste pits were constructed by the community during the project for disposal of household solid waste and animal dung (NRCS WASH Division 2012). The final report indicated that 56% of households had improved waste management practices (BS 2%, target 75%) including burning and burying waste, and that 39% of households had access to and use of a garbage pit (BS 1%, target 25%) (NRCS WASH Division 2012). The look-back study stated that household and environmental cleanliness had declined since the end of the project, with reduced self-reported use of waste disposal pits and washing platforms (Gonzalez et al. 2013).

This apparent decline in household and environmental cleanliness was mentioned by several participants, who indicated that the end of the project had led to a loss of focus on these issues:

Those days we always visited home every day. So people were concerned as we visited their home and they followed it. However, it feels that it is different than it was before although people use toilet, some people have stopped using their dish washing places. Yes, I think it has decreased a little bit . . . Some people think, just doing these for Red Cross, and we are not visiting their houses every day, so are little careless now. (Village Health Motivator, female)

Activities have a little bit slowed down like cleanliness, cleanliness activities, but still we have the habit of using the toilet and about cleanliness I think is very high in this community. (Men’s FGD)

They indicated there was a need for ongoing community-based awareness raising, post-project completion, to retain focus on and commitment to hygiene behaviours. Participants variously suggested that Female Community Health Volunteers, women’s groups, local health workers,
children’s clubs could play an ongoing role in WASH awareness raising and education post-intervention.\textsuperscript{12}

From observation of approximately 180 households, however, the field trip indicated that most households keep their house and surrounding areas clean, there was limited visible garbage (some households said they burn their rubbish) and animal waste, and the majority of washing platforms for kitchen utensils were observed to be in use.

![Washing platform](image)

**Figure 7:** Washing platform

There remained fairly high levels of awareness and motivation to maintain cleanliness both in the home and the surrounding environment. The majority of participants indicated that the key benefits of environmental and household cleanliness are health-related, namely reduction of disease. Many people said there was less diarrhoeal disease due to improved environmental cleanliness:

> Our children used to suffer from some diseases, but we are not sick now. We don’t have diarrhoea now. They used to play in polluted area and they suffered from diarrhoea, but now the environment is clean and they use the toilet and eat fresh food and they are not suffering from diarrhoea. (Women’s FGD)

> If we clean our home by uniting the entire family, then that will be benefit for the family. If we didn’t clean then we would be sick. (Raju, male, 62 years)

> For a person to live long it is very necessary for cleanliness and hygiene. It starts with food, cleanliness, hygiene, cleaning of larger surroundings, streets. (Men’s FGD)

\textsuperscript{12} The Nepal Sanitation and Hygiene Master Plan notes that women/mothers’ groups, forest users groups, ex-army groups and youth clubs etc. are active in cultural, social and community welfare activities. In recent years, they have been an active catalyst to promote sanitation activities. Agencies are increasingly mobilising CBOs in the sanitation sector (Government of Nepal 2068).
Health outcomes: treatment of water-borne and water-related disease 2010-13

To measure the effectiveness of behaviour change activities within a program or project, it is important to measure indicators for relevant health outcomes (Claxton 2012). Key informants working in the health sector spoke of significant improvements in health in Kotgaun VDC subsequent to the project, particularly reduction in childhood diarrhoea. Measuring the health impact of WASH interventions, however, is notoriously difficult (BRAC et al. 2010).

The data provided were those notified to the Rolpa District Public Health Office central databank. The data relate to the three years from July 2010 to June 2013. It is not possible to identify with any certainty reductions in disease rates as sufficient longitudinal data is not available. The data available, however, identify disease notifications and treatments by VDC health facilities. These VDCs can be identified as non-ODF or ODF at the time that this analysis was undertaken.

The data regarding treatment of diarrheal disease are interesting, and need further clarification. Analysis indicates that, overall, rates of disease have fallen everywhere in Rolpa District. ODF-declared VDC populations had consistently and significantly lower rates of diarrhoeal disease in the years for which data is available (2011-13: ODF VDCs, 48.1 cases per 1,000; non-ODF VDCs, 53.7 cases per 1,000. p=<.01). In children under 5 years of age, district-wide treatment rates for diarrhoeal disease, dysentery and pneumonia have fallen over the last three years. In VDCs that have been declared ODF (as compared to non-ODF VDCs), however, there are higher rates of diarrhoea and dysentery in children under 5 years of age (see Annex 3). This may be because parents in ODF-declared VDCs are more aware and are more likely to seek treatment for an unwell child if they have been exposed to WASH interventions and ODF programmes. Research indicates that information on health and health care can stimulate health service access and treatment-seeking (Ensor and Cooper 2004).

Malaria is an important water-dependant infection, in which anopheles mosquitoes (the species which transmits malaria in Nepal) need standing water to lay eggs to hatch into the larval stage before metamorphosing into adult plasmodium parasites to breed and continue their lifecycle (see Annex 4). Ninety percent of Rolpa district is above 2,000 metres (30% over 3,000 metres) with a temperate to subtropical climate, and therefore at moderate risk of malaria transmission, particularly in the warmer months. The transmission of malaria to small children is an important indicator of the amount of standing water available to mosquitoes for breeding sites in the area. There was a lower rate of malaria among children aged 2 months to under five years in VDCs which are declared ODF (1.74 cases per 1,000) than areas which are non-ODF (2.20 cases per 1,000). This ecological finding has occurred in the absence of a specific malaria prevention programme as a part of the WASH project, and suggests the WASH program areas have better water protection and storage practices than those without.

13 In remote areas of Nepal, confirmation of a diagnosis of malaria is typically made by visualisation of the parasites in a blood smear. It is likely that Rolpa malaria diagnoses are made by lab confirmation.
**DRIVERS OF BEHAVIOUR CHANGE: Societal/structural**

Societal/structural motivators (and obstacles) refer to the broad organisational, institutional and cultural factors that influence hygiene behaviours, which includes laws, policies, climate/geography, and distribution of products/WASH hardware (Dreibelbis et al. 2013).

**Institutional leadership and advocacy: The role of Nepal Red Cross Society volunteers**

Community-based Red Cross Red Crescent volunteers are critical to the implementation and success implementation of their hygiene promotion programmes. Their role is to mobilize their own communities and support the hygiene behaviour change process. Long-term volunteer involvement helps to increase capacity and strengthen the community (IFRC 2007).

The NRCS was critical to the delivery and implementation of the WASH project in Kotgaun VDC. NRCS volunteers were able to initially target those most receptive to change, and then move to other wards as momentum was created. During the project period NRCS were highly active in organising and running information and education and health promotion sessions relating to health, hygiene and sanitation. This included: ‘public health classes’ by four female Village Health Motivators, distribution of relevant visual IEC materials in local language, message boards (hoarding boards, wall painting and poster display), home visits, sanitation rallies, handwashing training, health baby competitions, street drama and song, clean house competition, and co-ordinating participatory methods such as faeces calculation and yellow flagging of open defecation. The NRCS District Chapter made efforts to ensure that these activities were locally appropriate, allowing on-the-ground realities and responses to shape intervention content. In recalling these activities, the NRCS sub-chapter President indicated that these methods were critical for supporting behaviour change, as they were suitable for the community and easy to understand:

We organised healthy baby competition among mothers, toilet competition to see which is so neat and clean, and house surroundings to see whose house is neat and clean. Just observing their houses, their toilet, their babies, their kitchen, we give them pride. Because our project goal was how to bring changes among the people, including those who were unknown about hygiene, those who were unknown about how to use toilets. While we were there in the initial phase, just nearby their houses there were piles of stools. It was really shocking. What to say. But slowly we constructed the toilets with the sub-chapter, and it became really comfortable. We organised different programs, we launched different activities. (NRCS Volunteer, District Chapter)

NRCS volunteers are part of the community, and they provided peer-support and influenced community norms, triggering hygiene behaviour change in homes and villages. NRCS was frequently named by community members as a primary source of information and motivation to improve hygiene behaviours, particularly in relation to handwashing, construction and use of toilets, methods for cleaning water, environmental cleanliness, and the health-benefits of improved sanitation and hygiene:

Nepal Red Cross Society has a great role to help us. They have group work also. They arrange training programs to help. (Bimala, female, 23 years)

People are totally educated now. They know how to make their surroundings clean, and Nepal Red Cross run the safe sanitation and hygiene project from which people really benefitted. Before that time many pigs and cattle were freely outside by the road and many people go to toilet nearby the
road. Many people when they come here they think negative about the place. But Nepal Red Cross run the seminar about handwashing and as well every home should have toilet. (Men’s FGD)

There was no education before the Red Cross project for the people. After the project people got education, from the motivators, they became aware of the way to use the toilet and they think they will be safe from the diseases, that they would get less diseases if they use the toilet. Before the time, the project, people suffered from the diarrhoea, but now they get education to wash their hands after the toilet, before eating, before the breakfast, before lunch, dinner. (Bikram, male, 40 years)

Red Cross volunteers and staff also placed high value on their work. Importantly, the project provided a supportive environment for the development of leadership roles among key NRCS volunteers, which encouraged local responsibility for sustained hygiene behaviour change. Below, the NRCS District Chapter Chairperson talks about achieving ODF status:

People who live in Kotgaun they feel proud as this was the first VDC that was declared ODF in Rolpa district and it was a very important project. That time we declared ODF in 2011, still Nepal had not prepared that WASH Master Plan. So it was very challenging to work at that time as there were not rules and thinking of the people, and we had to declare ODF and no-one was taking responsibilities and from government side no-one was talking about ODF. But people supported us, including political support in Kotgaun. (NRCS Volunteer, District Chapter)

The NRCS District Chapter employed four female Village Health Motivators who worked across the nine wards of Kotgaun for the duration of the project. Their responsibilities included establishing women’s savings groups (14 were established), holding community meetings to disseminate education (e.g. about handwashing, use of toilets, use of washing platforms, health impacts of improved sanitation and hygiene, communicable diseases, fecal-oral route of disease transmission), and conducting household visits to observe and motivate improved sanitation and hygiene. These Village Health Motivators recalled their roles and activities as being valuable and effective:

We had flip charts; we had monthly meetings, we motivate them during meeting. On the other hand, we had to visit 8 to 10 households in a day. We used to monitor these houses, see the changes and if still people were not following the instructions, we used to motivate and suggest them more. (Village Health Motivator)

I did important work in the Red Cross project. I disseminate the idea about health and sanitation, I practice myself and my family and I also motivate others to do that. (Village Health Motivator)

One Motivator pointed out that while it was her job, she felt committed to her responsibilities because she was working in her own community, saying: “I also wanted to make the community as a better community. I felt I had responsibilities for my community”. Similarly, many community members recalled the Village Health Motivators, whom they often referred to by name, as having an important role in improving sanitation and hygiene behaviours in their communities.

The four local Village Health Motivators (each responsible for between 1-3 wards) were paid a small salary for their full-time roles over the duration of the project. These motivators have now taken on other roles and responsibilities and have not continued their intensive community-based work. However, one indicated she still does some educational and community-based work in her own ward:
I am local citizen of this place and I live here also after the program is over. Whereas person outside
this place might have worked well during three years but would not care about the period after the
program is over. But for us, this place is ours so it is important for us to continue it although the
program is over. (Village Health Motivator)

This highlights the importance of engaging local community members as ‘change agents’, and the
value of including people in key roles who will have ongoing roles and commitment in the
community. Previous research in Nepal has found that health and sanitation programmes that have
active community participation and develop a sense of local ownership are most successful (WaterAid in Nepal 2011). In this project, the continuity (pre-, during, post-project) and leadership
of the NRCS volunteers, and their commitment to their communities and enthusiasm appear to have
been significant factors in the projects’ effectiveness and sustainability.

Climate Change
Nepal is highly vulnerable to climate change and increased incidence of natural disaster. The
Himalayan range serves as an important source of freshwater for 1.5 billion people living in its
floodplains who depend on seasonal melts of ice to sustain water river flows (ADB 2010). Climate
change and the decline in alpine ice cover pose a serious threat to downstream water sources, both
within Nepal and the surrounding region. There is also the threat of more frequent landslides, which
can destroy infrastructure in mountainous regions (ADB 2010). Glacial melts pose the risk of
outburst floods from glacial lakes (IFS-UTS 2011). While future projections of precipitation and
freshwater availability in Asia are uncertain, the Intergovernmental Panel on Climate Change (IPCC)
states that increased water demand due to population growth, increased water consumption, and
lack of good management are likely to increase water scarcity for most of the region (IPCC 2014).

Many people noted changes to their climate and environment, saying ‘water is more scarce now’.
They attributed increasingly unreliable or scarce water supply to changing rainfall patterns, altered
weather patterns, and deforestation:

Before I could sell the production but now I do not sell. It’s only enough for us . . . It’s unpredictable
rain, it’s not on time. Due to which we can’t plant on time. (Anju, female, 63 years)

The ice is melting faster from our glaciers and it is getting warmer . . . And the rainfall is different.
Before it used to be raining with great regularity. We knew when the rain would come, but now there
is less regularity. Sometimes there is more rain, sometimes less. There is less regularity now,
sometimes drought sometimes rain. That is a great problem for us. (NRCS Volunteer, District Chapter)

Yes, we have lots of effects of climate change. We have felt the season of plantation had moved
forward or backwards. We have changed a lot in the production and in the plantation as well. Another
thing is, the springs are drying up. How I can say that is even in the dry season we were not able to
cross the river due to high amount of water, and now there is very less water and we can cross easily.
Springs are decreasing and that is why there is not more water in the river. (Sanjay, male, 35 years)

Climate change raises significant issues around equity and sustainability, as it is anticipated that
adverse impacts of climate change in Nepal will significantly affect the poorest and most vulnerable
groups (Carlow et al. 2011). An emerging challenge facing WASH programs in Nepal is finding ways
to ensure that changes achieved in hygiene behaviour can be sustained, particularly in times of
water shortage. Awareness-raising about the potential for climate change-related water variability is
important. The main focus during dry periods should be on maintaining HWWS and recycling
household grey-water for pour-flush toilets.
DRIVERS OF BEHAVIOUR CHANGE: Community

Community-level drivers and barriers of hygiene behaviour change refer to the physical and social environment in which individuals are situated, as well as the formal and informal institutions that shape individual experiences (Dreibelbis et al. 2013).

Provision of technology or ‘hardware’

The provision of water and sanitation ‘hardware’ in Kotgaun VDC – e.g. toilets, protected water source, washing platforms, waste pits – provided a critical foundation for the adoption of improved hygiene behaviours. Participants spoke primarily about the construction of (i) toilets and (ii) water schemes.

Table 8: Key hardware/technology constructed during project

<table>
<thead>
<tr>
<th>Hardware/technology</th>
<th>Target</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household toilet construction</td>
<td>800</td>
<td>856</td>
</tr>
<tr>
<td>School toilet construction</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Washing platform</td>
<td>700</td>
<td>748</td>
</tr>
<tr>
<td>Waste pit formation</td>
<td>100</td>
<td>152</td>
</tr>
<tr>
<td>Utensils drier formation</td>
<td>500</td>
<td>603</td>
</tr>
<tr>
<td>Water scheme construction</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: NRCS WASH Division 2013

(i) Toilets: The project provided partially subsidised sanitation facilities (for permanent pour-flush latrines) to all households in Kotgaun VDC. This appears to have been central to achieving ODF status in all nine wards with 100% coverage of permanent latrines in households. NRCS staff and community members emphasised that the drive to achieve 100% coverage of permanent latrines came largely from the community:

People got educated about the project and they demand more toilets, then there were demands for making toilets, and they fulfil that demand. Firstly when the project was launched the target was not ODF for the village, but to have more awareness campaigns. First target was smaller – 800 households were here in Kotgaun and the target was 400 toilets. But later on they aimed for ODF. The awareness level increased and they also demanded toilet. It turned to declare ODF in the whole VDC. (Men’s FGD)

Households contributed to latrine construction, and the main latrine materials were subsidized by the project (the cost of a permanent pour-flush toilet unit in Nepal is around USD100) (Gonzalez et al. 2013). The majority of participants reported that NRCS assisted them with building toilets in their home, primarily through the provision of materials (i.e. cement, pan set, high-density pipes, iron rods, tin for roof). They said that they either built the toilets themselves (provided the labour) or paid for labour:

I have a toilet in my house. It is a cement one. Half part has been helped by the Red Cross and half part we made it ourselves. NRCS provided us with tin for the roof, pipe, toilet seat/pan, and cement. And our family made it. (Bimala, female, 23 years)

Every house has its own toilet. Red Cross gave cement, pans and rods, and the community built them. Before the project there was open defecation, but now everyone uses the toilet. (Men’s FGD)
These material subsidies for construction of toilet featured as an important driver for the construction of household toilets. Advocates of non-subsidy approaches to sanitation interventions (e.g. pure CLTS) argue that the community should develop their own sanitation facilities and choose latrine models that suit their capacity and resources. Minimising hardware subsidy and leveraging local household investment is regarded as the best way to ensure that toilets are wanted, maintained and replicable (DFID 2013). Key disadvantages of non-subsidy approaches are that governments will fail to invest in sanitation, people need protection from their neighbours excreta as much as their own, and non-subsidised toilet design can be variable and sub-standard posing risks for the environment and human health. Further, there are significant concerns regarding the impact of non-subsidised approaches for hard-to-reach communities and poor people, since affordability and access to low cost toilets are serious constraints in many countries (Cavill et al. 2015; Gonzalez et al. 2010). For example, a UNICEF evaluation of CATS (Community Approaches to Total Sanitation) programmes, including in Nepal, found that lack of subsidy for sanitation infrastructure meant there were sustainability and equity concerns for hard-to-reach and ultra-poor populations (see Cavill et al. 2015). In this project, which used a partial-subsidy approach, people have had sustained access to high quality permanent latrines resulting in high levels of satisfaction among community members.

The Look-Back study indicated that while latrine coverage has been sustained, with a household coverage rate above 90%, it concluded that the permanent pour-flush design is expensive and self-replication is low (Gonzalez et al. 2013). This evaluation found that some people living in newly built houses have built toilets themselves. The construction of these toilets has been funded by both personal resources as well as community loans. There seems to be a marked socio-cultural shift toward the expectation that all homes have toilets and that people do not defecate in the open:

We built ourselves. We used toilet before in the jungle, but if we have the toilet in the house then that will be easier for us so we built. (Raju, male, 62 years)

When we moved here one year ago we made the toilet. We made it ourselves, my husband and I. Inside the toilet cement has been used, but outside there is mud . . . . All the other toilet has been made with the help of organisations, but this one we made a year ago and we made by ourselves. (Anju, female, 22 years)

When people build a new house they make toilet also. They get materials themselves from Libang. If they don’t have much money they get a loan from the community and they pay back when they can. (Women’s FGD)

Three participants, however, indicated they did not have a toilet in their home (two homes were newly constructed, the members of the other household were overseas working for the duration of the project), and they referred to the lack of material support from NRCS as the primary problem:

I don’t have a toilet. We have a big family and when I got married we separated from my family, so there is no toilet in our new house. Before people got help from Red Cross. But now there is no help. (Women’s FGD, Dalit caste group)

Pour-flush sealed pan toilets are promoted by national and local authorities in Nepal. It is necessary to consider strategies by which pour-flush latrines could be replicated post-project by poorer and newly-built households.
The project aimed to ensure that schools have sustainable access to latrines and sanitary facilities. Three school latrine blocks were visited. Some of these schools did not make available appropriate facilities for sanitation and hygiene, with two toilets locked (reportedly, the key was lost) and another not functioning (hardware was broken). Lack of latrines in schools may force school-children in particular to revert to open defecation, thus reducing the impact of the behaviour changes achieved by the community. Where adequate and secure sanitation facilities are not available, young girls (particularly after puberty) are less likely to attend school. Schools must provide separate and secure toilets for boys and girls as well as male and female staff members (IFRC 2012).

(ii) Water schemes: During the project, three new water schemes were constructed and eight existing schemes were repaired or renovated and these schemes benefited 424 households and four schools (Graf 2011; NRCS WASH Division 2012). There were some inter-ward tensions as not all wards were beneficiaries of the new and renovated water schemes. The final report indicated that 65% of households (BS 17%, target 60%) and 89% of schools (BS 40%, target 60%) had easy access to safe drinking water (NRCS WASH Division 2012). The look-back study indicated that two years after the project had ended 73% of water schemes were operational and 80% of the household survey respondents indicated they collect water from the communal tap-stands.

Participants indicated that availability of clean and reliable water was central to their capacity to sustain good hygiene behaviours:

It is cleanliness. We have water everywhere. Before we had to walk long to get water . . . now we have water in our home, so we can clean as well. We have bathroom, so we can bath easily. (Tara, female, 34 years)

There is a reserve tank outside and from there comes the water to our house . . . Before the water only came in the morning time, but now water comes all the time. That is a benefit. If we want to bath then water is there, so that is a benefit to have a water tap. The water is clean. Before the water wasn’t purified and before time it only came sometimes. But now water is clean, before it was an open tank like a pond, but now we have a tank that is closed. (Shrijana, school girl, 16 years)

Many spoke about the benefits of these improved water sources, namely: reduced time and effort for collecting water (particularly for women and children); increased availability of water for household and personal use; and, increased availability of clean and good quality water.

However, there was also substantial concern regarding preservation, availability and reliability of water sources. Participants said that: the water springs do not provide sufficient water; other (higher elevation) wards use and divert piped water so the lower wards relying on these water sources are not able to access water; local water sources are being depleted; some tap-stands are dry; water user committees have insufficient funds to carry out tasks in order to preserve and maintain water sources (e.g. provide covers for community water tanks); and, there is insufficient water in the dry season:

There was a tap in the upper side but that is totally dry now because they didn’t preserve their water. We look after our water. It is 29 years old, and still that tank has preserved water because it is surrounded by wire and has a cement cover. But the people on the upper side didn’t preserve their spring water. (Hari, male, 33 years)
We don’t have any water in our home, none of us. There is no water. There is the water from the public tap, but in the warm season there is not any water in the tap so we have to walk to faraway places. It takes more than 35 minutes. Many people of the family have to go, children, men and women. (Women’s FGD)

We can find only pillar and tap, but no water. They bring the pipe, but we can’t see the pipe. Where does that pipe go? The political leaders are the problem, that fact has happened, the different parties quarrel with each other so the Red Cross water has not been provided. The water from ward 3 and 4 does not come to us in ward 1. That is the main problem. (Men’s FGD)

People spoke of needing to collect water from more distant water sources (particularly during the dry season), not having sufficient water to flush and clean toilets or maintain personal hygiene, and relying on less-clean water sources. This findings reiterate those of the look- back study which indicated that three of the eleven water schemes that were rehabilitated/newly constructed were operating but with some problems, including low yield during dry season and faulty taps (Gonzalez et al. 2013).

Community-level motivations: affiliation, status, collective transformation

While provision of hardware provides a critical foundation that allows hygiene behaviour change, drivers of behaviour change also operate through psychosocial pathways.

Affiliation: Affiliation and conformity with local social norms are known to be powerful drivers of behaviour (Curtis et al. 2009). In this project site, improved hygiene behaviours appeared to be motivated by a desire to join in and do as others are doing, in order to ensure conformity and membership in their communities. Further, hygiene behaviours were presented as a communal activity that created collective efficacy in terms of improved health and cleanliness in their villages. Activities such as use of toilets or handwashing were referred to as established community-level norms:

It is nice to use the toilet because the surroundings are clean. Before there were a lot of diseases, because people defecated near the river there were a lot of diseases and there were lots of flies. Now the whole community is cleaner, not just my own family. (Amar, male, 54 years)

Now the whole community is educated and use the toilet. They have got the training to wash their hands from Red Cross, and the whole project too. To educate the people to eat the fresh foods, use the toilet and safe drinking water. (Men’s FGD)

All people are neat and clean, all people have the toilet, we could see defecation in the open area but we can’t see that now. All is good now. (Women’s FGD)

Status: Participants appeared to be driven to improve hygiene behaviours in order to enhance not only their individual status, but specifically the status of their communities. Overwhelmingly, people spoke with a sense of civic pride regarding improved environmental and household cleanliness in their villages, particularly pride that their communities were now perceived by others as ‘clean’, ‘nice’ or ‘beautiful’ rather than being regarded as ‘dirty’, ‘smelly’ and ‘bad’:
We learn many things: clean the water, clean the toilet. This VDC is now very nice to visit. Before people felt it was dirty coming to Kotgaun because there was a lot of defecation on the road, but now when they come they think it is beautiful. (Shrijana, school girl, 16 years)

There have been great changes in our community. We can see faeces in the open area before, but now every home has a toilet with the help of Red Cross. We can’t see dirty things, no dirty smells in the areas. (Men’s FGD)

Before time there were not any toilets and the road was so dirty, people come here and they express that Madichaur is a bad place. But that has been solved now . . . It has been six years since we all had toilets. (Bimala, female, 23 years)

In particular, there was widespread sense of civic pride that Kotgaun was the first VDC in Rolpa District to be declared ODF:

Kotgaun was declared the first VDC to be ODF in Rolpa, so it has its own importance. It is not good to have open defecation. It was not easy for people to defecate in the toilet in the beginning, but later on the practice have been improved and now people use the toilet very well. (Men’s FGD)

We felt good because being ODF means that we have toilets and there are less diseases and we are clean. (Women’s FGD)

The countries with the greatest success in achieving ODF communities have made sanitation a high political priority (Cavill et al. 2015). In Nepal, the 2011 National Sanitation and Hygiene Master Plan outlined specific targets to achieve universal toilet coverage end open defecation by 2017, with VDCs that have achieved ODF status being recognised in annual awards (Steering Committee for National Sanitation Action 2011). As of September 2014, 1671 VDC, 18 municipalities, and 15 districts have been declared ODF (http://www.wash-rcnn.net.np/nwa/odf-updates.html). It is worth noting, however, that in most communities in Nepal the achievement of ODF status is a planned event, the date for which is fixed at the start of the process. This means that the ODF date does not necessarily reflect an actual achievement of ODF (Evans et al. 2009). Further, key informants indicated concern that the impetus to achieve ODF-status is an excessively top-down approach informed by national-level targets and policy frameworks, and it can result in an excessive focus on latrine coverage without adequate attention to hygiene promotion. And yet it is important to note that ODF processes that focused on community-level efficacy and change, according communities in Kotgaun VDC a recognised sense of status and achievement, resonated with community-level drivers of hygiene behaviour change in Kotgaun VDC (e.g. civic pride, status).

Community transformation: People consistently spoke of their villages as collective sites of transformation, specifically in relation to improved WASH conditions. The overwhelming narrative was one of community-level change. Improved WASH was spoken of as a ‘civilising’ process. Particularly when asked to describe the ‘most significant change’ that occurred as a result of the project, many groups and participants referred to transformations at the community-level:

Before we used to go to the open space for defecation, we did not have toilet so we used to find open places on our land or near the river where we went for defecation. After the Red Cross arrived in our community for the program, we started making toilets. And then we all realised that making toilet was not sufficient, then we also made the places where can wash our hands and wash our dishes. (Women’s FGD)
Our village was not good, it was polluted, faeces everywhere and animals, dogs, pigs everywhere. Now it is very clean. (Tara, female, 34 years)

People are aware, there have been great changes due to the project and ODF. All people have toilets in the home, they use the toilet regularly, they clean the toilet, they clean their homes, they clean their surroundings. (Men’s FGD)

The ‘most significant change’ story below highlights – both narratively and visually – the sense of community transformation following the intervention. The pictures were drawn by the men’s group, to accompany their story.

MOST SIGNIFICANT CHANGE: Men’s group

This figure (top right) shows before the arrival of Red Cross. There are houses, there are not any toilets, people are going to the toilet in the open area, the animals are in the open area, we can see the dirty things around the ground near our house as well as on the road, there is the smell of faeces. The water comes from the well and that is not safe for drinking.

The next figure (bottom right) shows after the project. They are the same houses but they are clean. They all have the toilet. The ground is clean. They all have some separate areas to clean the utensils as well as to throw the rubbish. They have separate house to keep the animals. There is safe drinking water from the tap.

There are two people in this story, Hari and Ram, and this is the impact: people did not have bad diseases from activities like these (referring to first picture of pre-project village). The main impact is that we all should have a toilet and separate area to keep the animals as well as safe drinking water and then we can be clean and our surrounding can be clean.
Community Engagement

There is evidence that sustainability of improved hygiene behaviours in WASH programming is related to support and engagement within communities and leadership (Cavill et al. 2015). In Nepal, community-driven development approaches to WASH emphasise community management of resources, service delivery and infrastructure construction. The broader success of community engagement depends on the ways that groups are formed, the depth of the social mobilization process and the level of effort to bring in people from excluded groups and give them genuine voice and influence (ADB 2012). This allows people to develop self-confidence, develop the ability to negotiate and influence decisions, and become involved in collective action. In contrast with approaching people as project ‘beneficiaries’, in genuine community engagement and participation people’s own agency becomes central (Green 2012).

In addition to the central role of NRCS volunteers, the wider community were actively engaged by NRCS throughout the project, including: Women’s Self-Help Groups (14 formed); Junior Red Cross Circles (one re-mobilised and two more formed) and Children’s Clubs; Water User Committee (wards 1/3/4, 2, 7). The NRCS District Chapter volunteers stated emphatically that community engagement was central to the project’s successes and sustained behaviour change:

We are Red Cross volunteers and our staff tried our best. We communicated, we actually organised programs and for our programs we requested social workers to take part, school teachers, mother’s groups, sub-health post office staff, and other stakeholders. . . Because of child club members, social workers, other stakeholders’ active participation and regular follow up, we got success. (NRCS District Chapter Volunteer)

This important role of community participation was also reflected in the words of many community members, who spoke of their roles and responsibilities in community mobilisation and education both during and following the project:

Red Cross has shown us the way, but Red Cross could not do everything alone. So women’s group and children’s group, we had to work together for the change here. Maybe we are not as efficient as we were before, but still we do. (Riva, female, 29 years)

All people, Nepal Red Cross Society, but all people combine together to help the Nepal Red Cross Society and make the Kotgaun ODF. Also political leaders, child clubs, Junior Red Cross circle, whole community - everyone has played an important role. (Men’s FGD)

This extensive community engagement and sense of community responsibility for project outcomes and sustainability is in part attributable to the excellent knowledge and networks of NRCS volunteers, who worked to facilitate community networks and collaboration. Although a few participants maintained a ‘dependent’ mind-set, asking for further contributions from NRCS, most reiterated the view that they ‘had to work together for the change’.

- Women

The project sought to improve the social status and empower women through: formation of women’s self-help groups, with particular focus on the most vulnerable; and including women in community groups such as the Water User Committees. Fourteen women’s groups were formed, and these groups held regular meetings and established saving and credit activities. Women’s
groups were involved in providing health education classes, leadership training and skills development, and running interest-based loan schemes funded through small monthly membership fees to support livelihood efforts (goat-keeping, sewing, hatchery) and everyday expenses (children’s education, medicines) (NRCS WASH Division 2012). Women’s groups were also active in providing loans for construction of toilets:

I joined the women’s group and at first people teased me but then other women joined. We used to give loans for people who wanted to build a toilet, but now everyone has paid back their loans and no-one has asked for a new loan. (Kalpana, female, 29 years)

MOST SIGNIFICANT CHANGE: Women’s group

This is the story of a community where women were not aware about education and they had different problems in the community. They did not know about different diseases and the community was also very polluted. At the same time we had educated people visiting us from Red Cross who educated women as well as other people in the community and we encouraged us about sanitation and cleanliness. They also provided education for the women and we were able to form different groups. These groups were mobilised to educate each other and keep the community clean, as well as we also were aware about cleaning the food and how to keep it clean after cooking it due to which we have become less ill compared to before. The main problems we want to share in this story are: women were very backward in the beginning. We didn’t have any idea that our houses and community had to be clean we did not used to clean our food before we ate. Then what we learned during this program, and the changes we had are: we formed women’s group and we had more education and we were aware about cleanliness and we started cleaning our houses and surroundings. Then we also were aware about nutritious food and cleanliness.

Women frequently spoke of the important role that women’s groups played in contributing to sustained hygiene behaviour change in their communities. Women stated that these self-help groups were a forum through which they gained education about sanitation and hygiene:

In the beginning we joined the women’s groups and we discussed cleaning the toilets and washing the hands. Now we don’t go but still we are practicing as we clean our houses and keep the toilet clean. (Women’s FGD)

Perhaps more importantly, women and women’s groups played a strong role in supporting project activities in their villages, particularly awareness-raising around hygiene behaviours. Project workers drew on a mixture of PHAST strategies (participatory health awareness training) and CLTS (disgust, shock, shame, mobilisation) in order to mobilise women as a driving force behind creation and enforcement of new sanitation norms and improved hygiene behaviours (Graf 2011). Though membership and activities have changed over time, some of these women’s groups were said to still be functioning, with many indicating that women have continued to play an important role in sustaining local-level commitment to improved sanitation and hygiene in their homes and communities:

I am involved in the women’s group and mother’s group. I went to the meetings. I learnt from the Red Cross society and the women’s group to clean the toilet and to wash hands . . . we used to have meetings, two meetings in a month. One with the women’s committee and one with the agricultural
user’s committee. And we share knowledge on cleanliness and hygiene practices: wash hands, use toilet and stuff like that. (Women’s FGD)

There were many women’s groups formed and they helped people to learn to use the toilet, and united the people also, so it was better than before. (Hari, male, 33 years)

There was also some evidence of sustained impact on women’s broader capacity building and empowerment. As one woman said:

Before we didn’t know anything we were only confined within the house. But after this program we had women’s group and we participated in different activities due to which I think we have been empowered and we have been able to speak in front of people. (Women’s FGD)

Rolpa, however, already had higher gender equity (relative to other parts of Nepal) due to the influence of the Maoist movement. A widely noted feature of the civil conflict was the high degree of women’s participation, and the Maoist emphasis on women’s liberation (Graf 2011, Leve 2007). Nonetheless, the participation of women in the WASH project reportedly contributed further to gender equity and to changing the way that men and women interact within the community (Carrard et al. 2013).

- Children

Children were engaged as important change agents for sanitation and hygiene at the individual, family, institutional and community level. School-based Junior Red Cross Circles were formed (one re-mobilised and two more formed), and Children’s Clubs were involved in activities. Through these children’s groups, children were: taught about personal hygiene and sanitation through Red Cross volunteers; encouraged to develop habits around school and household cleanliness, use of toilets, management of garbage pits, and use of washing platforms; encouraged to serve the community through, for example, awareness programs and cleaning their communities; and acquainted with Red Cross principles. A few young people indicated that their children’s groups are still engaged in environmental cleanliness efforts.

The NRCS District Chapter President regarded children as central to the project outcomes, stating that ‘child clubs and junior circles played a vital role in the success of this project’ because children learn easily, change their habits readily, and facilitate change within their families and communities. Children were taught about hygiene and sanitation through schools, Junior Red Cross Circles and the children’s clubs. This education also contributed to the wider dissemination of learning within the community, as children went on to become ‘change agents’ at the family and community level:

I teach my parents. If we don’t purify the water we will suffer from different disease, and we should wash our hands before eating the food. I teach them that . . . I feel like I have played an important role . . . Red Cross gave information to us, but we should not only depend on Red Cross, we should also do by ourselves. Ourselves and the VDC also should improve that, clean the toilet and the surrounding area. (Shrijana, school girl, 16 years)

I have a granddaughter . . . and when she came she washed hands, and she taught us to wash hands. We all know, from small to big, we all know about the benefits of washing hands so we are clear. (Men’s FGD)
- **Water User Committees (WUC)**

WUCs were formed, trained and provided with funds and tools for repair and maintenance tasks. WUCs continue to function in Kotgaun VDC, and they remain involved in maintaining and cleaning the water schemes. However, it was unclear who is now responsible for complex maintenance tasks, whether the Operation and Maintenance (O&M) fund set up by the NRCS is being used, or whether household cash contributions are still collected as a means to raise funds for water scheme maintenance and caretakers. There was some indication that the wider community has taken on partial responsibility for maintaining and cleaning the water tanks:

> The community is better now. They had training in cleaning the water tanks. Our person was cleaning the water tanks, but he went to India. The community have now gathered together to clean the tanks.

*(Aman, male, 70 years)*

- **Social inclusion**

The CLTS literature emphasises a need for working across the entire community – including people with disabilities, the elderly and the marginalised - in order to achieve improved hygiene behaviours (Cavill et al. 2015). The justification for this is strong both in terms of health benefits and equity. This project sought to include the entire VDC in project activities. Efforts to include disadvantaged were noted in some interviews and group discussions (see below).

**MOST SIGNIFICANT CHANGE: Men’s group**

This story is the story of a man who is the resident of Kotgaun ward number 6 and he belongs to the disadvantaged and poor group. NRCS in support of water and sanitation and health project, supported by Austrian Red Cross, provided him with training on how to make toilet. And it improved his livelihood because he used his skills in making the toilet in the community. So after this project with his skills he was able to make the toilet of different houses in the community and so his income has increased. And since he made the toilets for others he also made the toilet for himself at his house. He was an example: a person from a disadvantaged and poor community can also make a toilet, he was an example for the community and other people also took him as an example and they were encouraged to make toilet in their place. Before the project people used to defecate openly, and feed to the pigs, but now everyone has toilet in their home.

While the overwhelming majority of people indicated they had been included in project activities, a few – all lower caste (i.e. Dalit) - said they felt excluded from project activities and that they had received minimal communication and engagement:

> People are here from the Red Cross but they didn’t understand us, they don’t communicate between them and us. The language is the same, same village, but they are mostly educated people and educated people are proud. So there is not any communication with us. (Raju, male, 62 years)

In Nepal, caste-based discrimination remains a major barrier for Dalits in accessing services and resources, and in their ability to participate in decision-making processes. In traditional Hindu belief, Dalits are considered “impure” and polluting, so their access to water sources is particularly problematic. Their poor outcomes in education (e.g. illiteracy) and health are a result of a combination of factors, including poverty and discriminatory attitudes (ADB 2012). This highlights
the importance of specifically including and engaging vulnerable populations in project activities.

**Community engagement and sustainability**

Follow-up and reinforcement are critical for sustained hygiene behaviours, but are often neglected in WASH projects due to time-restraints and limited capacity, funding and resources (Cavill et al. 2015, UNICEF 2014). In this project, follow-up and reinforcement were built in to the project design with Expected Results including: increased capacity of NRCS Rolpa (district chapter, Kotgaun sub-chapter) to carry out development projects; strengthened capabilities of targeted communities to sustain project outputs; and training for members of the NRCS chapter and sub-chapter and establishment of community groups.

Several participants suggested that people in key existing roles in their communities could be better included in project activities, in order to ensure sustained follow-up and reinforcement post-project implementation (e.g. MOHP Female Community Health Volunteers, health workers, hospital staff, community leaders):

> Every ward has women’s health volunteers. So we can make mothers group use them, conducting meetings and providing different education from these volunteers. (Village Health Motivator)

Post-project support could be provided by government staff who have continuity in their engagement with local communities. In Kotgaun, the VDC has responsibility for many aspects of sanitation and hygiene, and intends to allocate funds toward hygiene awareness and sanitation activities. There are ongoing incentives for having and using a toilet and practicing hygiene behaviours, as the VDC only provides recommendations and references for those who do so:

> As VDC we have strict rules now. We provide a card to every household, where it is clearly mentioned that they have a toilet or not. If people do not have a toilet they are not provided with a card. If they want any facility from VDC they need to show the card. Just for example the confirmation for citizenship or any other recommendations necessary from the VDC. So, such kinds of facilities they will not get until they have a toilet. (Sanjay, male, 35 years)

Studies have highlighted the need for reinforcement activities and external support to ensure that hygiene and ODF behaviours are sustained. Local government that actively promote sustained hygiene behaviours is important, with evidence that clearly defined roles for local government staff contributes to sustainability (Cavill et al. 2015). Close collaboration with local government during the project phase could develop an institutional context that enables sustained hygiene behaviours post-project. However, in Nepal where local government capacity remains weak, projects should also provide space for service providers, local leaders and community members to take responsibility for shifting and sustaining hygiene behaviour change post-project (ADB 2012). A potentially effective new structure (established by the VDC Grant Operation Manual) are village and ward citizens’ forums that aim to create spaces for all citizens to discuss, negotiate, prioritize and coordinate development efforts, ensuring they are both inclusive and equitable (ADB 2012).
DRIVERS OF BEHAVIOUR CHANGE: Interpersonal

Interpersonal motivators (and obstacles) refer to interactions between individuals and the people they are intimately associated with, including household members, close friends and neighbours. At this level, drivers of hygiene behaviours include roles and responsibilities within the household, social norms, shame, and behavioural modelling (Dreibelbis et al. 2013).

Nurture

Parents, both mothers and fathers, spoke about their children washing their hands at key times. However, the responsibility to nurture and care for a family was regarded as the domain of women. Several women, mothers, spoke about the importance of improved hygiene behaviours in order to protect the health and well-being of their children. Hygiene behaviours were presented as means of caring for or ‘nurturing’ children:

I taught my children to wash their hands and we should cover the food. If we don’t cover the food my family and I suffer from disease. (Women’s FGD)

To protect the children we wash their clothes and wash their hands after going to the toilet with soap, and if soap is not available then we wash hands with ash. (Women’s FGD)

I am afraid of disease. If I didn’t wash my hands, or my son and daughter didn’t wash her hands, then they can get a headache, common cough, diarrhoea. To prevent from those kinds of problem, we wash hands. (Anju, female, 22 years)

Household structure/gender roles

Particular cultural practices and gender norms can contribute to disadvantage and challenges to sanitation and hygiene behaviours. In Nepal, many women face a discriminatory practice during menstruation known as chhaupadi. In the far-West, menstruating women and girls are confined in a small hut (‘chhau’ hut) or livestock quarters, as they are regarded as impure, and they are prevented from participating everyday activities. A similar practice occurs during childbirth and in the 11 days following. Of concern for WASH-related projects is that menstruating women are not allowed to use the same water resources and sanitation facilities as others (White, Sharma and Das 2012). While toilets are newly introduced with no tradition of exclusion, the practice of exclusion has been extrapolated from other household sites.

In this project, we asked participants whether chhaupadi had influenced their capacity to practice good hygiene behaviours, but women indicated that this practice was not continued in their VDC, reportedly due to increased education and literacy:

No, we always use the toilet. We didn’t do that for a long time. I heard about that from the radio and newspaper, that used to happen before, but that doesn’t happen now. It is less now. People’s views have changed. (Riva, female, 29 years)

It was difficult in the beginning, many years before we had difficulty during the menstrual period as we were separated from the home and we had to live differently. We were not allowed to touch the kitchen and food and water sources. But now it is not like that. We stay together in the same home and we use the toilet and also we clean ourselves. (Women’s FGD)

Chhaupadi may be an important cultural practice to consider and respond to in other project areas.
Males and females have different needs and capacities which affect hygiene behaviours – e.g. women and girls have greater responsibility for domestic chores, child-rearing and water collection. As women are traditionally responsible for household work and children, it is reasonable to focus on women as a target group. The health classes mainly focused on women and children and men were less willing to participate as sanitation was not regarded as their domain. Yet hygiene promotion is also critical for men and adolescent boys, particularly in sites where women cannot influence male hygiene practices or where women need men’s support to adopt new hygiene behaviours in the home (Sijbesma 2010).

**Shaming (and fining)**

Numerous people spoke of the importance of hygiene behaviours in order to avoid shame and stigma within their communities:

If you defecate in an open area people can see you and you will be shamed. (Men’s FGD)

We did not have a toilet in the beginning and many people had to go far for this. It would be a part of shame when other people would find us in the jungle, and it would be shame to meet us on the way (Men’s FGD).

Several people recalled the community-implemented fining systems, for those who defecated in the open. This CLTS behaviour change process is based on the use of shame: collective awareness of the risk of open defecation is used to trigger desire for change. In Kotgaun VDC, fining systems, flagging of faeces, and shaming were implemented which were overseen by women’s groups and children’s clubs. Several participants said that these strategies were excellent for generating social pressure and positive changes. Money was collected for use by the groups:

The members of the children’s club look at other people’s toilets in the district, and when they know that people are not going to the toilet and going to the toilet in the open area they report them and they pay the money . . . In toilet people didn’t put the water and they don’t clean the toilet or use the toilet, then there were cases when we penalised them. The children’s club collected the money, when people didn’t use the toilet we collected the money and we put the money towards other schemes and programs for the children’s club . . . I feel happy because when we collect then people realise they should not do it again. (Shrijana, school girl, 16 years)

We made a women’s group and people who didn’t know how to use the toilet, we taught them and forced them to use the toilet. We involved all the community in the meetings. We collected money when people didn’t use the toilet, and put the money to women’s group. (Women’s FGD)

The fining system appears to no longer be in operation; several participants said there is no need to collect fines as everyone in the community has and uses the toilet. Both women and younger people believed, however, that the fining and flagging system was effective and justifiable during the early stages of the project as it achieved improved sanitation in their communities:

We don’t feel shame to fine them. We are honest they should use the toilet. If other people take fine from them then they realise we should use toilet and not do in open area. (Women’s FGD)

At first we collected fines for people who did defecate in the open. Now every house has a toilet . . . Yes we felt shy but it is good that people get a lesson so for that reason we collected the money and it is not for us personally but for the women’s group which can be used later. (Women’s FGD)
In the purist CLTS approach, shaming practices are used in order to discourage open defecation. Shaming practices include imposition of community fines, intercepting and discouraging open defecators, placing flags with offender’s names in faeces, children patrolling fields whistling and flagging as they spot offenders (Cavill, Chambers and Vernon 2015; Gonzalez et al. 2010). In the Red Cross/Red Crescent context, questions of justice, rights and cultural sensitivity are raised. Gonzalez et al. (2010) suggest that these shaming activities may seem culturally insensitive and disrespectful toward communities, colliding with Red Cross/Red Crescent Code of Conduct. There is a risk that disadvantaged community members will be stigmatized due to open defecation practices.

In this project, shaming and fining of individuals who persisted with open defecation appears to have been an effective deterrent. Most community members appear to be ‘comfortable’ with fines and shaming as a deterrent to open defecation. Other CLTS implementers, however, have opted for more collective forms of social pressure, focusing on disgust and community-level awareness of the risk that open defecations poses for the entire community. Indeed, a study in Bangladesh found that persuasion, social norms, public education and community level monitoring were more effective ways to motivate sustained hygiene behaviour change than threats, coercion and fear (Hanchett et al. 2011). Despite its apparent effectiveness in the Kotgaun project, this softer approach focusing on collective social pressure may be better aligned with Red Cross/Red Crescent principles. This is a vexed issue that raises important questions about how best to judge whether an approach as appropriate.
DRIVERS OF BEHAVIOUR CHANGE: Individual

Individual motivators (and obstacles) refer to socio-demographic factors (e.g. age/gender), individual cognitive factors, and attitudes toward products/hardware and behaviours (Dreibelbis et al. 2013). In this evaluative research, key individual motivators for hygiene behaviours included disgust, comfort, perceived health threat, and perceived health benefits. Table 9 (below) provides examples of quotes that illustrate individual motivational factors.

Table 9: Sample quotes illustrating individual motivations for hygiene behaviours

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Sample quote</th>
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<tbody>
<tr>
<td><strong>Disgust:</strong></td>
<td></td>
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<tr>
<td>Viewing poor hygiene as</td>
<td>Because of our dirty behaviour, our dirty habits, our ancestors faced many diseases and health problems. But now with handwashing and healthy behaviour, they learn. (NRCS District Chapter Volunteer)</td>
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<td>contaminating, dirty, or</td>
<td>The toilets are easy to use. It is dirty to defecate in an open area, now we have been educated. (Men’s FGD)</td>
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<tr>
<td>disgusting.</td>
<td>Only some people who were educated and gentle used to go to the toilet, but many people used to go to the forest nearby the house. That’s too dirty. (Men’s FGD)</td>
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<td></td>
<td>We wash our hands. If we didn’t wash our hands then we can’t eat the food. If we wash the hands then dirt will be removed from the hands . . . . Morning, evening, after going to toilet, before having breakfast and lunch. (Raju, male, 62 years)</td>
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<td><strong>Comfort:</strong></td>
<td></td>
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<tr>
<td>Enjoying the feeling of</td>
<td>It feels good to have a toilet, and environmentally it is nice to have a toilet, because it is clean. (Shrijana, school girl, 16 years)</td>
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<td>being clean.</td>
<td>Having toilet is being clean, our surrounding is clean, flies are not around so we are not sick. (Anju, female, 63 years)</td>
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<tr>
<td></td>
<td>We felt good because being ODF means that we have toilets and there are less diseases and we are clean. (Women’s FGD)</td>
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<tr>
<td><strong>Perceived threat:</strong></td>
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<tr>
<td>Fearing health threats.</td>
<td>Before toilet using, before declaration of ODF, people used to go the deep place before the toilet. Before declaration of ODF and before they toilet near the home, many people went to forest nearby the pond and same water came to the home for drinking purpose and many people suffered from diarrhoea. (Men’s FGD)</td>
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<td></td>
<td>We used to get sick, problem with our hands, ears, diarrhoea, people use to die of diarrhoea, but now no people die of it. (Anju, female, 63 years)</td>
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<td></td>
<td>We wash our hands before eating and after eating, also if we work in the fields and come to the home then we wash our hands, we also educated our family to wash their hands. If they didn’t wash their hands then they suffer from big diseases. (Men’s FGD)</td>
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<td></td>
<td>Germs will attack our hands, that’s why we wash our hands, and to prevent from the different kinds of diseases. If we don’t wash our hands then we suffer from different kinds of diseases. We should be healthy, we need personal hygiene. I don’t like to eat without washing hands. (Riva, female, 29 years)</td>
</tr>
<tr>
<td><strong>Perceived benefit:</strong></td>
<td></td>
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<tr>
<td>Having knowledge of health benefits.</td>
<td>We are safe from diseases if we wash our hands. (Men’s FGD)</td>
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<td></td>
<td>We are safe from diarrhoea now because there are no faeces in the road. (Pramila, female, 50 years)</td>
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<td></td>
<td>We are happy. We are happy because before the ODF there were many problems with health, due to that we didn’t have toilet and we suffered from diarrhoea and many bad diseases. But we are safe now. (Women’s FGD)</td>
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<td></td>
<td>There are not any major health problems in Madichaur. It has been a bit changed. All houses have their own toilet. Before building the toilet there were many problems. But after building the toilet in every home there are not any problems. (Bimala, female, 23 years)</td>
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</table>
Disgust emerged as a motivator for hygiene behaviours: hands have to be washed to remove “dirty things”, open defecation was regarded as dirty. Disgust appeared to be a motivator of hygiene behaviours when people felt that they individually or their environments/communities had become dirty and contaminated. Other evidence also points to disgust as being an important driver of hygiene behaviours, particularly handwashing (Curtis 2010). Comfort was also a motivation for hygiene behaviours, with people valuing the feeling of being clean.

Health messaging: It is widely argued that health messaging may not be an effective strategy for motivating behaviour change (Curtis et al. 2009; Langford and Panter-Brick 2013). Curtis et al. (2009) suggest that people’s reference to health impacts when asked why they wash their hands is likely to reflect a desire to give ‘the right answer’ and because other motives are harder to define. They argue that promoting planned health behaviours is challenging as it requires an individual to be convinced of plausible and high-value benefits and then make a conscious plan to adopt health behaviours.

In this project, however, health messaging around hygiene behaviours occurred alongside substantive changes to household and community environments: construction of toilets, provision of soap, improved household water sources, presence of educational materials, and formation of community groups. Community members were provided with health messaging, their environments were changed to support these behaviours, and extensive community engagement and participation occurred to support behaviour change.

Improved health was referred to by the overwhelming majority of participants as both a driver and positive outcome of hygiene behaviour change. Many spoke of improved hygiene behaviour as important preventive action to avoid poor health:

Firstly personal hygiene, and then water, cleaning of our premises, cleanliness of our food. First of all, for a person to live long it is very necessary for cleanliness and hygiene. It starts with food, cleanliness, hygiene, cleaning of larger surroundings, streets. (Men’s FGD)

Diarrhoea can be prevented by washing hands after the toilet, keeping the toilet clean, keeping food covered. (Women’s FGD)

And the majority of participants indicated that their village has become healthier, and that there are fewer water and sanitation–related diseases. In particular, many people reported that there had been a reduction in cases of cholera and diarrhoea as an outcome improved hygiene behaviours:

Diarrhoea; that is not seen now after using the toilet. (Men’s FGD)

They used to suffer from diarrhoea and cholera before the project. When the Red Cross hadn’t helped with the toilet, young people and older people suffered from the diarrhoea. But now they don’t. Now we know we should wash our hands, we have clean water. (Shrijana, school girl, 16 years)

We suffered from diarrhoea, cholera, cold . . . even my children, and also we adults suffer, but not now, it’s clean now. (Tara, female, 34 years)
Our children use boiling water to wash their hands as well as with soap . . . All people have habit to wash hands after the project left. (Hari, male, 33 years)

Habit, while central to everyday behaviours, is poorly addressed in the behaviour change literature (Curtis et al. 2009). Habits are formed through the interplay of initial commitment, remembering, and repeated performance, supported by planning factors (Mosler 2012). Habits are often almost automatic reactions to specific environmental cues, such as handwashing facilities that are in sight of toilet exits. Many hygiene behaviours occur as part of daily routines, but habits take time to establish both individually and at the community level (Curtis et al. 2009). Hygiene behaviours are more likely to be sustained where they can be readily integrated into daily routines and habits (Cavill et al. 2015). There is strong evidence emerging on the importance of habit in promoting and sustaining behaviour change (Dreibelbis et al. 2013).

Past hygiene practices initially presented a challenge to the routine adoption of improved WASH-related behaviours. For example, both Red Cross volunteers and community members recalled how some people initially felt reluctant to use toilets and it was difficult to change habits because people did not want to defecate in toilets which were ‘very white and clean’, because ‘it was new experience to squat in the toilet’, and because they initially ‘didn’t want to ‘use a toilet nearby the house’. However, participants indicated that ease of use of water and sanitation ‘hardware’ facilitated the formation of new hygiene habits. In particular, many people spoke about the proximity of the toilet and piped water to their house as a key motivation for establishing new hygiene behaviours:

Happy because it is so easy to use the toilet, because it is so close [to the house], and the water is close too. (Pramila, female, 50 years)

We have a toilet near the house. We used to have to go far for water, now it is also near the house. There are many advantages. We are very happy because we can clean our body and everything is near for us. (Women’s FGD)

A few women specifically described following the six steps they had learnt for good handwashing practice (i.e. wet hands, soap, lather and scrub, rinse, turn off tap, dry hands). Most people – both men and women - could name three or more times for handwashing. These handwashing times were spoken about as if they had been incorporated into their everyday habits. It is worth reiterating, however, that these statements were provided in the post-project phase subsequent to the delivery of extensive hygiene promotion, and they were not supported by structured observations of handwashing. Nonetheless, it is notable that the overwhelming majority of people could correctly name three or more critical times for handwashing (see Table 10 below):

We do it in the morning, before eating, after toilet, after working in the fields, and after doing dirty things such as cleaning the baby. (Binod, male, 26 years)

Before eating food, and before eating breakfast, after cutting the grass, and when we use cow dung, then we must wash our hands. Before cooking food we wash our hands. (Shrijana, school girl, 16 years)
**Table 10**: summary of stated critical times for handwashing, as stated by participants

<table>
<thead>
<tr>
<th>DAILY LIFE DOMAIN</th>
<th>STATED TIMES FOR HANDWASHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilet-related</td>
<td><em>before going to the toilet</em></td>
</tr>
<tr>
<td>Food-related</td>
<td><em>before eating</em></td>
</tr>
<tr>
<td></td>
<td><em>after eating</em></td>
</tr>
<tr>
<td></td>
<td><em>before cooking food</em></td>
</tr>
<tr>
<td></td>
<td><em>before working in the kitchen</em></td>
</tr>
<tr>
<td>Work-related</td>
<td><em>after working in the field</em></td>
</tr>
<tr>
<td></td>
<td><em>after tending the animals</em></td>
</tr>
<tr>
<td></td>
<td><em>after cleaning vegetables</em></td>
</tr>
<tr>
<td></td>
<td><em>after cutting the grass</em></td>
</tr>
<tr>
<td></td>
<td><em>after touching cow-dung</em></td>
</tr>
<tr>
<td>Household-related</td>
<td><em>after touching dirty things,</em></td>
</tr>
<tr>
<td></td>
<td><em>after dirty jobs</em></td>
</tr>
<tr>
<td></td>
<td><em>after cleaning everything</em></td>
</tr>
<tr>
<td>Child-rearing-related</td>
<td><em>before going to school (children)</em></td>
</tr>
<tr>
<td></td>
<td><em>after cleaning children/babies</em></td>
</tr>
<tr>
<td>Habit-related</td>
<td><em>in the morning</em></td>
</tr>
<tr>
<td></td>
<td><em>in the evening</em></td>
</tr>
</tbody>
</table>

Declaration of ODF status and the presence of ODF rules also appear to have been central to development of routines and habits. The ODF rules were posted on boards in each of the wards in the VDC. Many people spoke about hygiene behaviours as being determined by ODF regulations:

*It has been improved a lot compared to before. And there are some rules. If we see some dirty things in front of the home then we should clean, or if we see dirty things in front of the shop then we should clean. (Anju, female, 22 years)*

*After Nepal Red Cross arrived they have helped us, and they instituted a board. On the board is telling the fine for 100 rupees, and after that rule many people used the toilet. (Men’s FGD)*

**ODF rules stipulate:**

1. Houses must have their toilet open for use.
2. The toilet must be open for use to guests.
3. Everyone must keep their home and surrounding environment clean.
4. Households around which there is defecation will be penalised 100 rupees by the Water and Sanitation User Committee.
5. A person who does open defecation will be penalised 100 rupees; a person who reports open defecation will be rewarded 50 rupees.
CONCLUSION AND RECOMMENDATIONS
SUSTAINED BEHAVIOUR CHANGE IN RED CROSS/RED CRESCENT WASH PROJECTS

Evidence from this evaluation suggests that hygiene behaviour change has been widely sustained in Kotgaun VDC. While many participants in the evaluation said their improved hygiene behaviours were motivated by health benefits and avoidance of health threats, closer analysis indicated that broader technological, psychosocial and contextual factors were also drivers and barriers. It appears that the successes of the project emerged from an approach that sought to achieve hygiene behaviour change by working across a broad spectrum of drivers (see Table 11 below).

Key reported DRIVERS of sustained hygiene behaviour change included:
- the national drive to improve WASH status in Nepal
- provision of partially subsidised wat/san ‘hardware’, via NRCS
- presence and involvement of NRCS volunteers in education and awareness-raising, which supported creation of new social norms around hygiene behaviours
- community engagement including establishment and renewal of women and children’s groups and their inclusion in hygiene promotion activities
- shared local motivations to conform with new social hygiene norms
- civic pride related to transformation of WASH conditions (e.g. use and availability of toilets, environmental cleanliness) and declaration of ODF status
- triggers that tap into emotional drivers of behaviour change, such as shame and disgust
- desire to ‘nurture’ and protect children and family (particularly among women/mothers)
- desire to prevent illness and to promote good health
- establishment of conditions that support routine/habitual hygiene behaviours, such as handwashing with soap at critical times and visible presence of ODF rules in wards

Key reported BARRIERS/CHALLENGES of sustained hygiene behaviour change included:
- lack of momentum and ongoing hygiene education and awareness-raising in the post-project period
- lack of clarity about structures/institutions responsible for post-project hygiene promotion
- sense of exclusion among some disadvantaged community members (e.g. Dalit households)
- cost of constructing sanitation hardware (e.g. latrines) in the post-project phase, without access to partial subsidy
- reduced opportunity for local people trained in latrine construction to use their skills
- periodic water shortages from new/renovated water schemes (associated with climate and rainfall variability, seasonal changes, deforestation, maintenance problems and inter-ward tensions)
<table>
<thead>
<tr>
<th>Levels</th>
<th>Contextual factors</th>
<th>Psychosocial factors</th>
<th>Technology factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Societal/Structural</td>
<td><strong>DRIVERS</strong> National Water and Sanitation Master Plan (2011). National efforts to meet WASH-related MDG goals. National push to achieve ODF status.</td>
<td><strong>DRIVERS</strong> NRCS presence (National, District chapter, Sub-chapters) supports project implementation. High level of engagement in WASH by NRCS.</td>
<td><strong>DRIVERS</strong> National promotion of latrines/improved water sources. Provision of wat/san hardware (NRCS provides partial subsidy in many project areas). Nationally available materials for wat/san hardware.</td>
</tr>
<tr>
<td></td>
<td><strong>BARRIERS</strong> Remote/rural communities disadvantaged in WASH. Climate change/deforestation threatens water security.</td>
<td><strong>BARRIERS</strong> Socio-economic disadvantage/social exclusion (e.g. Dalit). Challenges for WASH sector management in Nepal.</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td><strong>DRIVERS</strong> History of Maoist activity in Rolpa district during conflict. Commitment by NRCS District Chapter/Sub-chapter to promote hygiene behaviour change. NRCS has strong engagement with local communities. NRCS has capacity to adapt program to suit local context. Access to wat/san facilities and hygiene behaviour change promotion.</td>
<td><strong>DRIVERS</strong> NRCS volunteers engaged in education/awareness-raising. Activities of NRCS Village Health Motivators. Community engagement in hygiene activities (women, children, water user committees). Shared community drive to achieve ODF status. High level of satisfaction with latrines and other hardware. Affiliation/new norms for hygiene behaviours. Hygiene associated with social status and civic pride. Exposure to diverse hygiene promotion message/methods.</td>
<td><strong>BARRIERS</strong> 100% latrine coverage (partially subsidised by NRCS). Improved/renovated/new water sources. Provision of wat/san hardware (HW stations etc.).</td>
</tr>
<tr>
<td></td>
<td><strong>BARRIERS/CHALLENGES</strong> Out-migration can limit access to education and household-level hardware installation. Maintenance/reliability of shared water schemes. Public health services limited.</td>
<td><strong>BARRIERS/CHALLENGES</strong> WASH in schools (e.g. toilet use) requires greater focus. Social exclusion of disadvantaged groups (e.g. Dalit). Community engagement dissipates post-project. Inter-ward tensions relating to water schemes.</td>
<td></td>
</tr>
<tr>
<td>Interpersonal/Household</td>
<td><strong>DRIVERS</strong> Gender roles: women typically targeted as they have primary responsibility for household hygiene. Engagement of men in hygiene promotion.</td>
<td><strong>DRIVERS</strong> Nurture; drive to protect children/family from poor health. Shaming/fining associated with open defecation and poor hygiene.</td>
<td><strong>DRIVERS</strong> Education/demonstration on use of wat/san hardware. Toilets and HWS are accessible for household members and community. <strong>BARRIERS/CHALLENGES</strong> Cost of constructing new toilets.</td>
</tr>
<tr>
<td></td>
<td><strong>BARRIERS/CHALLENGES</strong> Low household-income. Wat/san facilities are limited in agricultural work-sites.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td><strong>DRIVERS</strong> Disgust, comfort, perceived health threats and benefits. Knowledge of handwashing techniques. Self-efficacy to use wat/san hardware.</td>
<td><strong>DRIVERS</strong> Latrines and other wat/san hardware are convenient (near house).</td>
<td><strong>DRIVERS</strong></td>
</tr>
<tr>
<td>Habitual</td>
<td><strong>DRIVERS</strong> Information on habit formation (e.g. steps to HWWS) Knowledge of benefits of handwashing and hygiene. Accessible wat/san facilities promote habit formation. ODF signs visible in community.</td>
<td><strong>DRIVERS</strong> Soap available in VDC. Toilets/water/other WASH facilities available. Ease of using wat/san technologies (HW stations/toilets). <strong>BARRIERS/CHALLENGES</strong> Scarcity of water supply in the dry season.</td>
<td><strong>DRIVERS</strong></td>
</tr>
</tbody>
</table>
The NRCS volunteers and community stakeholders played a critical role in supporting strong project outcomes – including in relation to hygiene behaviour change – during a period of rapid transformation of WASH conditions in communities. Participants indicated that NRCS volunteers provided opportunities for genuine involvement in processes affecting their communities (e.g. a locally-led push to seek ODF status through 100% latrine coverage, establishment of women’s groups and Junior Red Cross circles, establishment of WUCs). Given the NRCS volunteers are local community members they were motivated to work with their communities in a careful, flexible and respectful manner, in which they included people and provided peer-support for hygiene behaviour change. NRCS volunteers noted the importance of establishing collaborative and effective relationships with local stakeholders (teachers, social workers, health workers etc.) in order to increase project effectiveness and sustainability. They were able to initially target those most receptive to change, and then move to other wards as momentum was created. Further, the project supported the development of leadership roles among NRCS volunteers, which further encouraged local responsibility for sustaining hygiene behaviour change. The important role of NRCS volunteers, in facilitating networks of collaboration and engagement, cannot be under-estimated.

There were likely unique characteristics associated with Kotgaun VDC that underpinned the challenges as well as the effectiveness and sustainability of the project: for example, it has low-development status and widespread poverty; it was at the centre of political unrest and a Maoist stronghold during the decade long civil war; there are high rates of out-migration of young men; and it has been upheld as a ‘model’ ODF village leading to extensive community pride and regular evaluation. Current international development research that is increasingly focused not on ‘best practice’ but rather ‘good fit’ with the political and socio-cultural realities of local contexts (Booth 2012; Roche and Ensor 2014). As has been pointed out in the recent DFID WASH Evidence Paper (DFID 2013), ‘best practice’ for specific delivery of WASH interventions is heavily dependent on context of different countries and settings, and in reality implementation of hygiene promotion models on the ground typically differ substantially from the model as it is conceived.

There is now increasing emphasis on: supporting locally defined solutions rather than importing ‘best practice’ models; flexible and adaptive project management that is responsive to complex local contexts; focusing on and understanding the drivers of positive change (i.e. positive deviance); and investing in ongoing action research to test and better understand assumptions about how to sustain positive change (Roche and Ensor 2014). Tailored approaches that adapt to local contexts are likely to be critical to achieving sustained hygiene behaviour changes in each community in which WASH projects operate.

This evaluation indicates that there were multiple contributing factors to hygiene behaviour change, including: (partially-subsidised) construction of sanitation hardware; renovation and construction of water schemes; the contribution and engagement of NRCS staff and volunteers; and, use of hygiene behaviour change messaging that links to diverse drivers of hygiene behaviour, from the habitual to the community and structural level. Importantly, health messaging was only one of a broad suite of triggers for hygiene behaviour change: effective triggers also included activities/messages with a focus on emotional drivers (disgust, nurture, and affiliation), creation of new norms, and elevation of civic pride related to personal and environmental cleanliness. It is the holistic and locally responsive nature of the intervention that appears to have been central to its successes.
RECOMMENDATIONS FOR FUTURE WASH PROJECTS

NETWORKS/COLLABORATION/COMMUNITY ENGAGEMENT

1. Future NRCS WASH interventions could learn from the experiences gained in the Rolpa-based project. It is recommended that NRCS Volunteers and project staff in new project sites (e.g. Bajhang) make exchange visits with staff involved in the Rolpa project to facilitate learning.

2. Red Cross Volunteers: Continue and enhance strategies to attract and retain Red Cross volunteers who have the capacity to work closely with local communities and support Red Cross/Red Crescent project implementation and management.

3. Place emphasis on engagement and coordination with government at all levels, particularly with government at the DDC and VDC levels. VDCs should be encouraged to form WASH coordination committees where they do not already operate. Engagement with other agencies and actors in project sites is also critical to supporting post-project sustainability of hygiene behaviours.

HARDWARE

4. Water supply needs to be assured in order to support hygiene behaviours. At the project initiation phase holistic participatory assessment that includes examination of community politics/inter-ward tensions can assist to identify local challenges relating to water supply and distribution. NRCS could implement activities to support increased clarity regarding roles and responsibilities for the decentralised system for rural water supply.

5. Toilet design and use must be suitable in contexts of water shortages. Whilst pour-flush latrines appear to be preferred to improved pit latrines, future sustainability is a critical issue: including awareness-raising about potential in the region for climate change-related water variability is recommended. The main focus during dry periods should be on maintaining HWWS and recycling household grey-water for pour-flush toilets.

6. As per Nepal Ministry of Education Standards, in areas where other WASH funding is not available or forthcoming, projects should include WASH programmes in Schools.

7. Material incentives/partial subsidies for toilets appear to be effective, particularly in terms of ensuring poor people have access to high quality latrines. The 2011 Nepal Sanitation and Hygiene Master Plan, however, promotes a non-subsidy approach for the sanitation sector. If a non-subsidy approach is selected, it is critical to ensure there is a mechanism in place (e.g. sanitation savings groups within CBOs) that can support poor households to install a latrine and to ensure ongoing latrine construction after the achievement of ODF status.
HYGIENE PROMOTION

8. Inter-personal communication and group dynamics appear central to the promotion of hygiene and establishment of new social norms related to hygiene behaviour. Personal contact (e.g. Village Health Motivators), group meetings and hygiene classes, and community-based participatory activities are effective behaviour change methods to support individual, household and collective processes of hygiene behaviour change.

9. Triggering tools: shame and shock (e.g. fining for OD, flagging of OD, faeces calculation, transect walks) appear to have worked in this community to trigger a desire for improved WASH conditions. Evidence from other research, however, suggests that people will invest in sanitation and hygiene for more positive reasons than shame and shock, including comfort, security and prestige (see DFID 2013: 79). For example, triggering tools can focus on increasing civic pride at a community level (see also Recommendation 10).

10. Education for hygiene behaviour should focus not only on health messaging but on broader motivations of change: e.g. civic pride, disgust, affiliation and status. This recommendation is aligned with current models of behaviour change (e.g. Curtis et al. 2009; Dreibelbis et al. 2013), and is consistent with the findings discussed in this report. Some hygiene promotion methods that might be expected to be effective include:
   a. Civic pride: encourage community members to focus on the development of ‘healthy’ and ‘clean’ villages (as per the Government of Nepal post-ODF plan), not only household or individual-level benefits. Methods might include declaration of ODF status, but also other modes of recognising community-level transformations (e.g. clean village awards).
   b. Disgust: focus on poor hygiene as a source of contamination and trigger disgust. Methods might include faeces calculation, use of images of faecal matter, or visual media that present the idea of unseen contamination on hands after visiting the toilet. Disgust, however, has to be carefully handled so as not to ‘turn people off’ or further marginalise community members (e.g. Dalits) who face greater challenges in improving their hygiene behaviours.
   c. Affiliation: make community members feel that ‘everyone is doing it’. Methods might include public pledges to wash hands with soap, that specify both when and how to do HWWS, or ‘buddy systems’ in schools that help children remind each other about HWWS. It is important not to focus on low rates of particular hygiene behaviours as this can drive rates further down (see Curtis 2010). Well-tailored and appropriate hygiene promotion, however, require formative research and community engagement to understand motivators of hygiene behaviours in specific project sites (see Recommendation 18 below).

11. Focus on development of habit and daily routine around hygiene behaviours:
   a. Habit is most readily formed at a young age, and families can be enlisted to help their children form good hygiene habits and develop ‘good manners’ (while inadvertently learning themselves).
b. Hygiene promotion can be presented in a way that supports the development of everyday habits around HWWS, latrine use and safe disposal of human excreta, safe water handling, and water use for personal hygiene purposes (e.g. systematic steps to handwashing, routines for safe-water handling)

c. Water and sanitation ‘hardware’ should be installed with a view to supporting the development of good hygiene habits. For example, easy-to-use and locally appropriate handwashing stations (e.g. simple designs that use locally available products or waste materials such as plastic bottles) could be an integrated part of latrine construction (see Curtis 2010).

12. ODF declaration appears to be a significant source of community pride. Signs that declare a ward’s ODF status should be prominently maintained in good condition.

13. Key hygiene behaviour change messages should be reinforced in the post-project implementation period, including handwashing with soap and safe-water handling.
   a. The MOHP Female Community Health Volunteers (FCHV) could be better linked with Village Health Motivators (remunerated by Red Cross projects), which could provide motivation for ongoing hygiene behaviour change education by MOHP FCHVs in the post-project phase
   b. It could be advisable to employ one Village Health Motivator per ward during project phases in order to benefit from their inclination to continue informally with longer-term hygiene promotion in their own communities.
   c. Post-project reinforcement of hygiene promotion could be timed to coincide with times of high health risk, such as the beginning of the rainy season when diarrhoea and acute respiratory infections often peak. Local health facilities and FCHVs could work toward this recommendation.

14. Women are key organisers and caregivers in the Nepalese household, and it is critical to include and educate women as hygiene promoters. However, hygiene promotion with women does not necessarily change the hygiene behaviours of men. Men should be further involved in hygiene promotion, with tailored topics and approaches. Involvement of male leaders and male Village Health Motivators could be a mechanism to support men’s inclusion.

15. Reaching poorest segments of society: if hardware subsidies are minimised or not available, toilet design must be available that is affordable to low-income, poor and ultra-poor groups. Active targeting and inclusion of poorest segments in hygiene promotion efforts is essential.

16. Involvement of children: children can play a key role as change agents in their communities. It is recommended that children are included both in hygiene education approaches, and that they are encouraged to disseminate and support improved hygiene behaviours within their families and wider communities.
17. Involvement of women: women’s groups are effective sites for hygiene promotion, creation of social norms and sense of affiliation, and development of savings/credit groups that can support WASH infrastructure and livelihood development.

M&E AND RESEARCH

18. Research in project sites: this project illustrates that adjustment of a project to take account of local conditions and needs ensures better outcomes.
   a. Formative research in new project sites can provide important insights about local motivations and barriers to hygiene behaviours, test media and hygiene education message with target groups, and determine how best to encourage people to adopt improved hygiene behaviours. For example, Curtis et al. (1997) reviewed 11 formative research studies that explored hygiene motivations using a range of qualitative and quantitative methods: one method was showing people pictures that depicted potential motives for handwashing and then probing for core motivations (e.g. nurture, disgust, affiliation, status). These types of formative research methods could be applied in project sites.
   b. Action research could be used to test and better understand assumptions about how to sustain hygiene behaviour change (i.e. deliberatively try innovative approaches).

19. Build on existing monitoring and evaluation processes, including through in-depth feedback from community members. Training on data collection (e.g. for baseline surveys) should be provided to data collectors to increase its reliability. Some key outcome measures require careful review; for example, handwashing data should include structured observation of handwashing, not just self-reported rates.
ANNEX 1: Brief political background to Nepal

Due to its geographical location and long history of being on a transport route, Nepal has a history of settlement from a variety of nations who bring with them their own ethnic customs and beliefs. In the mid-18th century, Nepal became a Hindu Kingdom with constitutional monarchy. From the mid-20th century the country became unstable, however development was slow culminating in riots in the late 1970s. A period of police and military oppression began, and although progress was made in some areas of population development, by the 1990s and accompanied by a climate of general economic instability, nearly twenty years of civil unrest began with strikes and confrontations (protests) between Nepalese people and the police. In 1996 the Maoists (whose headquarters were, and still are, situated in Rolpa in the hills behind Libang) stated that a ‘people’s war’ had begun. Rolpa became a Maoist stronghold of the Communist Party of Nepal.

On June 1, 2001 Crown Prince Dipendra apparently shot dead almost all of the Royal Family and then committed suicide. The shock of this event did little immediately to stabilise the country, however on 21 November 2006, Nepal’s decade-long armed conflict ended (1996-2006) with the signing of the Comprehensive Peace Accord (CPA) between the Government and the Communist Party of Nepal (Maoist), and the House of Representatives unanimously declared Nepal a secular state.

In 2007, a bill was passed in parliament declaring Nepal a federal republic and abolishing the monarchy. The bill came into force on 28 May 2008 and after nearly twenty years of civil strife, the country became a federal republic, and was renamed the Federal Democratic Republic of Nepal.

In April 2008, elections to the Constituent Assembly (CA) were held and the Maoists won in a landslide. They quit in May 2009 and were replaced by a 23 party coalition.

Elections were held again in November 2013 but political deadlock meant that a Prime Minister was not elected until February 2014.

The original timeframe of completing the constitution by 28 May 2010 proved too ambitious given the competing political agendas and the need for extensive public consultation. As a result the term of the assembly was extended four times and the last deadline was for 27 May 2012 to prepare a draft constitution. The Assembly, however, was not able to produce a constitution and it was dissolved on 27 May 2012.
ANNEX 2: Models of hygiene behaviour change

Mosler (2012) presents the ‘RANAS’ psychological model for hygiene behaviour change, and proposes that there are five domains that support the formation of new hygiene: risk factors, attitudinal factors, normative factors, ability factors and self-regulation factors. Risk factors refer to individual understanding and awareness of health risk; attitudinal factors express stance toward a behaviour; normative factors refer to convictions about incidence of a behaviour and broader social attitudes toward the behaviour; ability factors refer to aptitudes an individual believes they must have in order acquire the behaviour; self-regulation factors refer to continuance and maintenance of the behaviour. The RANAS model is intended to be relevant to multiple WASH interventions. The model, however, focuses largely on psychological determinants of health behaviours.

Curtis et al. (2009) present a theoretical framework for understanding the determinants of handwashing that incorporates: (i) individual-level planned, motivated and habitual behavioural determinants and (ii) social, physical and biological environmental determinants of behaviours (see Table below). The model is based on formative research (from 11 countries) that focused on the determinants of handwashing behaviours. They conclude that key ‘motivations’ for handwashing include both habit and emotional drivers such as disgust (desire to avoid and remove contamination), nurture (tendency to care for children), comfort (desire for one’s body to be placed in optimal conditions), and affiliation (desire to fit in with others in a reference group).

Table 12: Conceptual model of the causes of behaviour (Curtis et al. 2009: 660)

<table>
<thead>
<tr>
<th>BRAIN</th>
<th>HABIT</th>
<th>Learnt automated behaviours produced by cues and often part of a routine.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTIVATION</td>
<td>Tendency towards a state good for survival and reproduction. Such drivers and emotions include: disgust, status, affiliation, attraction, nurture, comfort, fear.</td>
<td></td>
</tr>
<tr>
<td>PLANNING</td>
<td>Pursuit of long-term objectives</td>
<td></td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td>SOCIAL</td>
<td>Individuals, groups and institutions that influence behaviour (e.g. local norms, regulations, religion)</td>
</tr>
<tr>
<td></td>
<td>PHYSICAL</td>
<td>Geographic, climatic, material and artefactual behaviours affecting behaviour (e.g. wat/san, house design)</td>
</tr>
<tr>
<td></td>
<td>BIOLOGICAL</td>
<td>Other life-forms and their products that influence behaviour (e.g. food stuffs, domestic animals and disease agents)</td>
</tr>
</tbody>
</table>

The SaniFOAM (for sanitation behaviours) and FOAM (for handwashing) are behavioural frameworks developed by the World Bank Water and Sanitation Program (Coombes and Devine 2010; Devine 2009). They identify three over-arching determinants of behaviour: opportunity to improve a behaviour (e.g. access, availability), ability to change a behaviour (e.g. knowledge, skills, affordability), and motivation to change a behaviour (e.g. values, priorities, social drivers).

Figueroa and Kincaid (2010) developed a model of communication for water treatment and safe storage behaviour. Their model indicates that communication interventions can influence behaviours at the individual level (cognitive, attitudinal, emotional, social), household level (time, decision-making practices, income), and community-level (community action, resources, cohesion, leadership). Theirs is a process-focused model which moves from communication intervention to intermediate outcomes to behaviour outcomes and then health outcomes, all of which are underpinned by environmental context.
Aunger et al. (2010) conducted a household study of handwashing in Kenya and concluded that handwashing behaviour is determined by three psychological processes: automatic or habitual responses, motivated and goal-driven processes to satisfy need, and cognitive factors reflecting conscious concerns. They found that habit and economic constraints were the strongest determinants of observed handwashing.
# ANNEX 3: Research team and research schedule

## Research team

<table>
<thead>
<tr>
<th>NAME</th>
<th>INSTITUTION</th>
<th>ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Celia McMichael</td>
<td>La Trobe University</td>
<td>Researcher</td>
</tr>
<tr>
<td>Dr Priscilla Robinson</td>
<td>La Trobe University</td>
<td>Researcher</td>
</tr>
<tr>
<td>Samista Manandhar</td>
<td>Nepal Red Cross Society</td>
<td>Co-researcher/research coordinator</td>
</tr>
<tr>
<td>Binod Dangi</td>
<td>Libang resident</td>
<td>Translator/research facilitator</td>
</tr>
<tr>
<td>Kusum Acharya</td>
<td>Libang resident</td>
<td>Translator/research facilitator</td>
</tr>
<tr>
<td>Jogendra Giri</td>
<td>Nepal Red Cross Society</td>
<td>Driver</td>
</tr>
</tbody>
</table>

## Research Schedule

<table>
<thead>
<tr>
<th>DATE</th>
<th>DAY</th>
<th>SITE</th>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>30/10</td>
<td>Thurs</td>
<td>Kathmandu</td>
<td>Celia/Priscilla arrive; meet Ritva Jantti</td>
</tr>
<tr>
<td>31/10</td>
<td>Fri</td>
<td>Kathmandu</td>
<td>Celia/Priscilla/Samista/Ritva/Amar – meet and review project aims and materials</td>
</tr>
<tr>
<td>1/11</td>
<td>Sat</td>
<td>Kathmandu</td>
<td>Day off</td>
</tr>
<tr>
<td>2/11</td>
<td>Sun</td>
<td>Kathmandu-Bhairabah</td>
<td>Celia/Priscilla/Samista/Jogendra - travel</td>
</tr>
<tr>
<td>3/11</td>
<td>Mon</td>
<td>Bhairabah-Libang</td>
<td>Celia/Priscilla/Samista/Jogendra – travel; meet District Chairperson and Secretary and translators</td>
</tr>
<tr>
<td>4/11</td>
<td>Tues</td>
<td>Rolpa, Kotgaun VDC</td>
<td>Fieldwork: Madichaur (ward 1)</td>
</tr>
<tr>
<td>5/11</td>
<td>Wed</td>
<td>Rolpa, Kotgaun VDC</td>
<td>Fieldwork: Budadhera (ward 4); Danadhera (ward 3)</td>
</tr>
<tr>
<td>6/11</td>
<td>Thurs</td>
<td>Rolpa, Kotgaun VDC</td>
<td>Fieldwork: Dangmang (ward 8)</td>
</tr>
<tr>
<td>7/11</td>
<td>Fri</td>
<td>Rolpa, Kotgaun VDC</td>
<td>Fieldwork: Rimshak (ward 5), Jhingsil (ward 6)</td>
</tr>
<tr>
<td>8/11</td>
<td>Sat</td>
<td>Rolpa, Kotgaun VDC</td>
<td>Fieldwork: Diga (ward 5 upper), Darbot (ward 6 upper)</td>
</tr>
<tr>
<td>9/11</td>
<td>Sun</td>
<td>Rolpa, Kotgaun VDC</td>
<td>Fieldwork: JYubang (ward 2), Danga/Misibang (ward 7)</td>
</tr>
<tr>
<td>10/11</td>
<td>Mon</td>
<td>Rolpa District</td>
<td>Transcription, MI informant interview: Libang</td>
</tr>
<tr>
<td>11/11</td>
<td>Tues</td>
<td>Rolpa District</td>
<td>Fieldwork: District Hospital visit and KI interviews</td>
</tr>
<tr>
<td>12/11</td>
<td>Wed</td>
<td>Libang-Pokhara</td>
<td>Celia/Priscilla/Samista/Jogendra - travel</td>
</tr>
<tr>
<td>13/11</td>
<td>Thurs</td>
<td>Pokhara</td>
<td>Review findings, preliminary analysis.</td>
</tr>
<tr>
<td>14/11</td>
<td>Fri</td>
<td>Pokhara-Kathmandu</td>
<td>Celia/Priscilla/Samista/Jogendra - travel</td>
</tr>
<tr>
<td>15/11</td>
<td>Sat</td>
<td>Kathmandu</td>
<td>Debrief with Ritva</td>
</tr>
<tr>
<td>16/11</td>
<td>Sun</td>
<td>Kathmandu</td>
<td>Celia/Priscilla depart</td>
</tr>
</tbody>
</table>
ANNEX 4: Notifications/treatment of WASH-related diseases in Rolpa District

Diarrhoeal Disease (DD), whole population: notified from and treated at health facility or in the community

<table>
<thead>
<tr>
<th>VDC ODF status</th>
<th>Number of VDCs</th>
<th>Total population</th>
<th>Diarrhoeal Disease (DD), whole population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>DD 2011-2012 (age-specific rate/1000)</td>
</tr>
<tr>
<td>ODF declared</td>
<td>24</td>
<td>101446</td>
<td>5224 (51.50)</td>
</tr>
<tr>
<td>ODF not declared</td>
<td>27</td>
<td>119725</td>
<td>7274 (60.76)</td>
</tr>
</tbody>
</table>

Children hospitalised, VDC not known

<table>
<thead>
<tr>
<th>Number of VDCs</th>
<th>Total population</th>
<th>Diarrhoeal Disease (DD), whole population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DD 2011-2012 (age-specific rate/1000)</td>
</tr>
<tr>
<td>ODF declared</td>
<td></td>
<td>207</td>
</tr>
<tr>
<td>ODF not declared</td>
<td></td>
<td>12704 (57.44)</td>
</tr>
</tbody>
</table>

(It appears that all of the hospitalised cases in 2011-2013 were under 5 years old, see table above); \(\chi^2 p<.01\)

Diarrhoeal Disease (DD) cases two months to five years: notified from and treated at health facility

<table>
<thead>
<tr>
<th>VDC ODF status</th>
<th>Number of VDCs</th>
<th>&lt;5 population</th>
<th>Diarrhoeal Disease (DD), two months to five years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010-2011 (age-specific rate/1000)</td>
</tr>
<tr>
<td>ODF declared</td>
<td>24</td>
<td>14931</td>
<td>3489 (233.67)</td>
</tr>
<tr>
<td>ODF not declared</td>
<td>27</td>
<td>15445</td>
<td>3599 (233.02)</td>
</tr>
<tr>
<td>Children hospitalised</td>
<td>204</td>
<td>207</td>
<td>195</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>30376</td>
<td>14380 (236.70)</td>
</tr>
</tbody>
</table>

\(\chi^2 p<.01\)
### Dysentery in children 2 months to under five years: cases notified from and treated at health facility

<table>
<thead>
<tr>
<th>VDC ODF status</th>
<th>Number of VDCs</th>
<th>&lt;5 population</th>
<th>Dysentery, children 2 months to under five years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010-2011 (age-specific rate/1000)</td>
</tr>
<tr>
<td>ODF declared</td>
<td>24</td>
<td>14931</td>
<td>481 (32.21)</td>
</tr>
<tr>
<td>ODF not declared</td>
<td>27</td>
<td>15445</td>
<td>448 (29.01)</td>
</tr>
<tr>
<td>Children hospitalised, VDC not known</td>
<td>26</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>30376</td>
<td>995 (31.44)</td>
</tr>
</tbody>
</table>

$\chi^2 p < .01$

### Pneumonia in children 2 months to under five years: cases notified from and treated at health facility

<table>
<thead>
<tr>
<th>VDC ODF status</th>
<th>Number of VDCs</th>
<th>&lt;5 population</th>
<th>Pneumonia, children 2 months to under five years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010-2011 (age-specific rate/1000)</td>
</tr>
<tr>
<td>ODF declared</td>
<td>24</td>
<td>14931</td>
<td>2767 (186.32)</td>
</tr>
<tr>
<td>ODF not declared</td>
<td>27</td>
<td>15445</td>
<td>2944 (190.61)</td>
</tr>
<tr>
<td>Children hospitalised, VDC not known</td>
<td>208</td>
<td>271</td>
<td>301</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>30376</td>
<td>5919 (194.86)</td>
</tr>
</tbody>
</table>

$\chi^2 p < .01$

### Malaria in children 2 months to 5 under five years: cases notified from and treated at health facility

<table>
<thead>
<tr>
<th>ODF status</th>
<th>Number of districts</th>
<th>&lt;5 population</th>
<th>Malaria 2 months to 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010-11 (Number and age-specific rate/1000)</td>
</tr>
<tr>
<td>ODF declared</td>
<td>24</td>
<td>14931</td>
<td>38 (2.55)</td>
</tr>
<tr>
<td>ODF not declared</td>
<td>27</td>
<td>15445</td>
<td>44 (2.85)</td>
</tr>
<tr>
<td>Children hospitalised, VDC not known</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>30376</td>
<td>87 (2.86)</td>
</tr>
</tbody>
</table>

$\chi^2 p .37$
ANNEX 5: Malaria in Nepal

Malaria is an important water-dependant infection, in which anopheles mosquitoes (the species which transmits malaria in Nepal) need standing water to lay eggs to hatch into the larval stage before metamorphosing into adult plasmodium parasites to breed and continue their lifecycle. There are four main species of malaria which cause disease in humans, known in descending order of numbers of infections worldwide as *P. vivax*, *P. falciparum*, *P. malariae*, and *P. ovale*. The first two of these are the more aggressive and more common infections, with *P. vivax* and *P. falciparum* being the species known to occur in Nepal, with *P. vivax* responsible for the majority of cases (WHO, 2014).

Whilst sophisticated tests are available in urban laboratories, in remote areas confirmation of a diagnosis of malaria is made by visualisation of the parasites in a blood smear (known as a thick and thin film). Positive visualisation tests are dependent upon the parasites being active at the time the test is taken. In Nepal, diagnosis is commonly made by thick and thin film visualisation. As malaria parasites are active in cycles of a few hours every 2-3 days (depending on the particular species) only positive tests are conclusive proof of infection, but negative tests are not proof of freedom from infection, and vivax parasites can remain dormant for months, or even years, so that it is possible to have an episode of malaria a long time after the original infection, despite appropriate treatment at the time. A recent survey suggests that less than one third of children under five with symptoms of malaria are tested for it (WHO, 2014).

Three species of Anopheles mosquitoes are thought to be responsible for local transmission (said to be *An.fluviatilis*, *An.annularis* and *An.Maculatus*). Whilst mosquitoes are able to tolerate cool conditions, breeding is not possible without shallow standing water, and as mosquitoes cannot withstand sub-zero temperatures is not surprising that the northern mountainous areas in Nepal are considered to be malaria-free. Prevalence of malaria in the lower regions is at about 1 case per 1000 people, in general higher on the terai. Ninety percent of Rolpa district is above 2,000 metres (30% over 3,000 metres) with a temperate to subtropical climate, and therefore at moderate risk of malaria transmission, particularly in the warmer months.

Adults are mobile and travel in and out of the area, providing increased opportunity for malaria acquisition, and are also at risk of recrudescence; therefore malaria infection does not provide useful information about the place of infection. However, the transmission of malaria to small children can be regarded as an indicator of the amount of standing water available to mosquitoes for breeding sites in the area, and therefore the degree to which household water sources are protected.
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