DFID Nepal Rural Access Programme (RAP3)
Monitoring, Evaluation and Learning Component

MIDLINE IMPACT ASSESSMENT REPORT 2016

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RAP 3
RURAL ACCESS PROGRAMME 3

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Executive Summary

1. Introduction

This midline report presents the findings from a panel survey of 3,600 households in eight districts in the Mid and Far West of Nepal and incorporates qualitative findings from a complementary Reality Check Approach (RCA) study. This mixed-methods approach was conducted in mid-2016, precisely two years after the baseline, to provide a longitudinal analysis of socio-economic changes in this region as well as an objective assessment of the impact of the third phase of the DFID's Rural Access Programme 3 (RAP3).

The analysis within the report is probably one of the most comprehensive assessments of change in the region undertaken in recent times. Read in conjunction with the separate midline RCA study report (whose findings are integrated into this report), the midline provides a rich analysis of a vastly understudied region of the country.

The report should be of use to a wide range of stakeholders interested not only in the impact of RAP3, but also in understanding regional drivers of change that impact on poverty and vulnerability.

2. Theory of Change

RAP3 has been running since 2013. Its objective is to contribute to poverty reduction in eight core districts in the Mid and Far West of Nepal. The programme aims to deliver economic benefits to the poor through rural road access and increased connectivity. It employs a labour-based approach to road work activities by directly employing poor and vulnerable groups in Road Building Groups (RBGs) and Road Maintenance Groups (RMGs) – the direct beneficiaries of RAP. As roads are a 'public good' anyone with access to the road is considered to be a (non-direct) beneficiary.

3. Survey design and methods

Questionnaire: The RAP3 baseline and midline questionnaire was designed with a view to capturing a wide range of hypothesised results of RAP3. The design used the Nepal Living Standards Survey (NLSS III, 2010-11) as a starting point, ensuring a large degree of consistency of definitions with national statistics, whilst stripping out some of the detailed sections of the NLSS that were not of interest in this case. This should ensure comparability of RAP3's indicators with existing and future rounds of the NLSS.

Proxy means test: Due to the difficulties of gathering accurate estimates of income from household surveys, the survey goes beyond income estimates to construct a composite indicator of consumption using a proxy means test (PMT) approach. This uses information from NLSS-III to model household consumption upon a range of explanatory variables, including health, education, demography, housing and assets. Through this, we are able to gather a multidimensional understanding of the drivers of household consumption that goes beyond our income estimates, and thereby achieve a more nuanced perspective on household poverty.

Sampling: The survey was conducted in RAP's four road construction districts (Humla, Mugu, Bajura and Kalikot) and four road maintenance districts (Doti, Achham, Dailekh and Jumla), with a sample size of 3,600 households. Each district contains three analytical domains: direct beneficiaries (RBGs and RMGs living within 1.5 hours walking distance to the road), non-direct beneficiaries in inner areas (within 1.5 hours walking distance to the road), and non-direct beneficiaries in outer areas (up to 5 hours walking distance to the road).

A great degree of variation in results across the analytical domains within the RAP3 districts provides sufficient plausible information about the likely counterfactual (the without-intervention case) through cross-comparison of these groups. In particular the non-direct beneficiaries in the inner areas can be seen as the counter-factual to the direct beneficiaries (receiving RAP wages) living in the same area.

Reality Check Approach: To provide a qualitative complement to the quantitative research conducted through the household survey, a Reality Check Approach (RCA) was undertaken in parallel with the household study. The RCA provides an 'interpretative lens' to the quantitative findings

The RCA provides findings in the following areas:

- How poverty is experienced and perceived in the different locations, taking a multi-dimensional view of poverty.
- The way that people currently make a living (with a view to understanding how short-term waged labour opportunities provided by RAP3 fit into the mix as well as the current level of diversified income opportunities and constraints to further diversification).
- The intended RAP3 outcomes related to better physical access by provision of new and better maintained roads as well as the upgrade to all weather roads to extend the usability of roads.
- How people view change, their aspirations and how this change may come about.

The full RCA report is presented as a separate document.

Integration of methods for analysis: The quantitative and qualitative data was first analysed separately. Further analysis was then conducted to produce a mixed methods report. Throughout the write-up of the report, there has been an iterative process of analytical feedback between the quantitative and qualitative streams, constantly leading to new areas of enquiry where further analysis could be conducted.

4. Findings

With the richness of the data and the make-up of the analytical domains, the findings unpack important and relevant emerging changes in Western Nepal that go far beyond just the impact of RAP3.

A. Emerging regional changes in the Mid and Far West context

Poverty

- The general trend across the region is that poverty has reduced slightly since 2014, although certain regions within districts have got poorer (Bajura, Kalikot, Achham, Doti).
- There has been a rise in PMT consumption in most domains. This rise has generally been greater in relatively poorer domains, indicating a degree of convergence.
- There is significant caste and gender variation in wellbeing (Dalits and female-headed households are generally poorer).

Vulnerability

- The ongoing **drought is an external shock** that has impacted across the region; it is one of the most important changes that matter to people.
- It has resulted in lower crop yields and had an impact on food consumption and dietary diversity across all domains (i.e. a fall in food security).
- Households have employed an increasing number of coping strategies to cope with drought – mainly in terms of food coping strategies (lower consumption of food and changes in food types consumed).

Migration

- Migration (mainly to India) has been a significant livelihood strategy in the region for generations. Whilst most migrants leave for work, people are also 'moving' out of the region for many other reasons, including for education or permanent relocation to other parts of Nepal.
- Trends in the level of migration in the past two years varies between domains – it has risen in some and fallen in others.

Demography and social change

- The demographic make-up of the region is linked with migration trends – an observed reduction in households' size is mainly due to male out-migration.
- This is linked to a sharp increase in female-headed households across the region and a growth in the proportion of labour-constrained households (e.g. old aged) left behind in the region.
- RAP targets the poor and vulnerable effectively in selecting RMG membership; these groups contain a disproportionately high number of female-headed households and Dalits.

Increasing need for cash

- The emergence of a cash-based local economy means that people are more reliant on cash for food purchases as well as paying for mobile phone connections, metred electricity connections to fuel a growing desire to spend on children's education.
- Most domains show increased spending on children's education.

B. Impact of RAP on direct beneficiaries

Impact on poverty/vulnerability for RBGs

- Those who have remained a part of RBGs over the 2 years see an increase in the wellbeing although most are still beneath the poverty line.
- Participants in RBGs are less vulnerable to the effects of the drought than non-beneficiaries – the drop in food diversity is less severe for RBGs pointing to a consumption-smoothing impact of RAP wages.

Income and savings

- Although largely a programme effect, incomes have increased for those in RBG/RMGs compared with those who are non-beneficiaries.
- RBGs maintain a constant source of income due to the security of work with RAP whereas other groups see sources of income falling.
- The relative contribution of remittances to total income has dropped for RBGs, although the median total income remains higher than average in the region.
- 72% of RBGs participate in savings group, highlighting that not all are taking part in the mandatory scheme.
- Median savings for RBGs are higher than for non-beneficiaries.

Health

- Members of RBG and RMGs are more likely to spend money on treatment for illnesses than other comparable groups.
- There is a large increase in the use of local shops to purchase medicine as an alternative to obtaining treatment from specific healthcare facilities.

Education

- There is strong evidence to suggest that households in the build region who had participated in RBGs spent significantly more on education than households who had not participated.

Assets

- There has been a large increase in the purchase of consumer assets by RBGs compared with other groups.
- There has been a significant increase in the number of productive assets purchased by RMGs. However there has been no significant change in case of RBGs.

C. Access to services

Roads and transport use

- Frequency of use of all roads has increased in maintenance areas, particularly for those living closer to the roads.
- The highest use of roads is in Achham.
- The majority of people perceive that RAP maintenance works has led to improvements in road conditions.
- The average fare paid for journeys increased significantly for journeys taking longer than one day, where the median fare paid at least doubled between 2014 and 2016. Prices for shorter journeys (<5 hours) remained similar in most areas.

Access to social services

- There was no change in accessibility to schools, health posts or VDC HQs. However there was an overall perception that the quality of these services has increased, although varied by domains.
- Health posts were used more frequently at the midline than the baseline, across both inner and outer domains. The percentages of households 'never' using health posts reduced

in the maintenance areas from 10% to 6% in the inner area and from 12% to 2% in the outer area.

- There is a strong preference for medicine shops over Government health posts.

Access to economic services

- There was no change in accessibility to local shop, agrovets and agricultural centres.
- There was a slight increase in the perceived quality of the local shops. At the 2016 survey 25% in the inner maintenance area rated the quality of the shop as 'good', up from 16% in 2014, whilst in the outer areas 20% rated the shops as good, up from 13% in 2014.
- There was an increase in the use of agricultural centres.

Local enterprises and economic activity

- The total number of households in the survey running private enterprises reduced dramatically between the 2014 baseline and the 2016 midline in the build districts, and stayed relatively consistent in the maintenance districts.
- There was a large turnover of households running enterprise. In the maintenance region and in the inner build region the majority of households running enterprises in 2016 were not running enterprises in 2014. In all domains the majority of households who were running enterprises in 2014 were not running enterprises in 2016.

D. Impact of Social and Economic Development (SED) sub-component of RAP3

Impact on poverty

- The SED sub-component of RAP had no impact on poverty or PMT consumption.

Executive summary

1. परिचय

यो प्रतिबेदन मध्य तथा सुदुर पश्चिम क्षेत्रका ८ जिल्लाहरुमा गरिएको घरधुरी सर्बेक्षण को नतिजामा आधारित छ | सर्बेक्षणका लागि जम्मा ३,६०० घरधुरी हरु छनौट गरिएको थियो | यसका साथै यो प्रतिबेदनमा (Reality Check Approach) अध्ययन का जानकारीहरुलाई पनि समावेस गरिएको छ | यी दुई अध्ययन २०१६ को मध्य तिर गरिएका थिए जुन बेसलाइन (Baseline) सर्बेक्षण भन्दा ठ्याक्कै दुई वर्ष पछि को समय हो | यसो गर्नुको कारण ग्रामिण पहुँच कार्यक्रमले उक्त क्षेत्रमा परेको सामाजिक, आर्थिक प्रभाबको विश्लेषण गरि एक तथ्यमा आधारित प्रतिबेदन तयार पार्नु हो |

प्रतिबेदनमा समावश गरिएका विश्लेषणहरु सायद उक्त क्षेत्रमा अहिले सम्म भएका यस्ता अध्ययन (आर्थिक, सामाजिक क्षेत्रमा भएका सुधारहरुको अध्ययन) हरु मध्ये सबै भन्दा बिस्तृत छन | यो प्रतिबेदन लाई Reality Check Approach (जसको नतिजाहरु येस प्रतिबेदनमा पनि समावेस गरिएको छ) अध्ययन संगै संगै पढियो भने उक्त क्षेत्रको बारेमा धेरै विश्लेषणहरु प्राप्त गर्न सकिन्छ |

यो प्रतिबेदन ग्रामिण पहुँच कार्यक्रमको प्रभाव बारे जान्न इच्छुक हरु को लागि मात्र नभएर उक्त भेगमा गरिबी घटाउन के कारणहरु ले महत्वपूर्ण भूमिका खेल्छ भनि जान्न चाहने हरुको लागि पनि उपयोगी हुनेछ|

2. Theory of Change

ग्रामिण पहुँच कार्यक्रम सन् २०१३ देखि संचालनमा छ | यस कार्यक्रमको मुख्य उदेश्य भनेको मध्य तथा सुदुर पश्चिमका ८ जिल्लाहरु को गरिबिं न्यूनीकरण मा योगदान गर्नु हो | कार्यक्रमले उक्त क्षेत्रका गरिब जनतालाई सडकको पहुँच बढाएर छरिएका बस्तीहरुलाई एक अपसमा जोडी आर्थिक लाभ पुर्याउने लक्ष्य लिएको छ | कार्यक्रमको सडक खन्ने काम श्रममा आधारित छ र सडक खन्ने काममा गरिब घरधुरीहरु लाई प्रत्यक्ष संलग्न गरिन्छ | कार्यक्रमका प्रत्यक्ष लाभान्वित समूहहरु सडक निर्माण समूह (RBG) र सडक सुधार समूह (RMG) हरु हुन् | सडक जसले पनि प्रयोग गर्न सकिने बस्तु भएकोले सडक मा पहुँच भएको सबै लाई अप्रत्यक्ष लाभान्वित भनिन्छ |

3. सर्बेक्षण बिधि

प्रशनावलि: कार्यक्रमको शुरुवात (Baseline) र मध्य (Midline) समयमा गरिएको सर्बेक्षणको प्रशनावलि ग्रामीण पहुँच कार्यक्रमले प्रभाब पार्न सक्ने क्षेत्रहरुलाई समेट्ने हिसाबले तयार पारिएको थियो | प्रशनावलि नेपालको जिवन स्तर सर्बेक्षण लाई आधार बनाइ तैयार परिएको थियो ता कि राष्ट्रिय स्तरको सित तुलाना गर्न सकियोस | यस् क्रममा कतिपय असान्दर्भिक बिषय बस्तु हरु लाई समाबेश गरिएको थिएन | यसो गर्नुको उदेश्य नेपालको हालको र भबिश्यमा हुने जीवन स्तर सर्बेक्षण र यस् कार्यक्रम को प्रभाब सुचकहरु को तुलना गर्न सकियोस भन्ने हो |

Proxy means test: घरधुरीको आय सम्बन्धी विवरण सङ्कलन गर्न कठिनाई हुने र आयको सही अनुमान गर्न पनि गाह्रो हुने भएकोले proxy means test को माध्यम बाट यस् अध्ययन ले खर्च को अनुमान गरेको छ | यसको लागि नेपाल जीवनस्तर सर्बेक्षण-३ को आधार मा घरधुरीहरु को खर्चको अनुमान गरिएको छ | खर्चको अनुमान परिवारका सदस्यहरुको स्वास्थ्य अवस्था, शिक्षा, उमेर, घरको अवस्था र सम्पत्तिलाई आधार मानेर गरिएको थियो | यो गर्नाले हामीलाई घरधुरीको खर्च लाई के के ले निर्धारणा गर्छ भन्ने जानकारी प्राप्त हुन जान्छ र हामी घरधुरीको गरिबीको कारण बारे पनि अझ धेरै जानकारी प्राप्त गर्न सक्दछौं |

नमूना छनौट: सर्बेक्षण ग्रामीण पहुँच कार्यक्रमको ४ सडक निर्माण जिल्ला (हुम्ला, मुगू, बाजुरा र कालिकोट) र ४ सडक मर्मत जिल्ला (डोटि, अछाम, दैलेख र जुम्ला) हरुमा गरिएको थियो र जम्मा ३,६०० घरधुरीहरु सँग अन्तर्वाता गरिएको थियो | प्रत्यक जिल्लालाई कार्यक्रमले समेटेको हिसाबमा ३ भागमा बिभाजन गरी नमुना संकलन् गरिएको थियो | प्रत्यक्ष लाभांवित (सडक खन्ने समुह-RBG र सडक मर्मत गर्ने समुह-RMG (जो सडक बाट हिंडेर १।५ घण्टाको दुरीमा बसोबस गर्छन्), नजिकका अप्रत्यक्ष लाभांवित (सडक बाट हिंडेर १।५ घण्टाको दुरी), र टाढाका अप्रत्यक्ष लाभांवित (सडक बाट हिंडेर १।५ घण्टाको दुरी) | यि बिभिन्न समुहमाहरुमा बसोबस गर्ने घरधुरीमा रहेको बिबिधताले प्रभाब मुल्याङ्कन गर्न आवश्यक पर्ने 'तुलना गर्न मिल्ने समुह' हामीलाई प्राप्त हुन्छ | विशेष गरेर नजिकका अप्रत्यक्ष लाभांवित समुह, जो प्रत्यक्ष लाभांवित घरधुरी हरु जतिकै सडक दुरी मा बसोबस गर्छन् तर कार्यक्रम

ज्याला प्राप्त गर्दैनन, ले 'तुलना गर्न मिल्ने समुह' लाई प्रतिनिधित्व गर्दछ |

Reality Check Approach: सर्वेक्षणका नतिजाहरुलाई अझ राम्रो सँग व्याख्या गर्नको लागि घरधुरी सर्वेक्षण का साथै Reality Check Approach बिधी प्रयोग गरिएको थियो |

यस् बिधी बाट निम्न क्षेत्रका नतिजा हरु प्राप्त गरिएको छ:

- गरिबीको बहु-आयामिक पक्षलाई ध्यान दिँदै बिभिन्न क्षेत्रमा बसोबास गर्ने मनिषहरुले गरिबीलाई कुन रूपमा लिएका छन् वा कसरी अनुभव गरेका छन् |
- मानिसहरुको जिविकोपार्जन (यस्को उद्देश्य कार्यक्रमले छोटो समयको लागि प्रधान गर्ने ज्यलाले मनिषहरुको जिविकोपार्जनमा कस्तो योगदान गरेको छ भनी बुझ्न हो |)
- नयाँ सडक सन्जाल तथा राम्रो सँग मर्मत गरिएको सडक वा सबै मौसममा चल्ने सडक कुन हदसम्म प्रयोग भएको छ अथवा कार्यक्रम को उद्देश्य अनुसार अनुसार प्रयोग भएको छ कि छैन |
- मानिसले सडक सन्जल बिस्तार् पछी भएका परिवर्तनलाई कसरी हेरिरहेका छन् र उनिहरुको आकांक्षा के के हुन |

Reality Check Approach को प्रतिबेदन एक छुटै प्रतिबेदन रुप मा प्रकाशित गरिएको छ |

विश्लेषणको लागि बिधीहरुको स-मिस्रण: सर्वेक्षणको डाटा र RCA को डाटा लाई पहिला छुटा छुटै विश्लेषण गरिएको थियो | पछी बिभिन्न विश्लेषणहरु गरी एउटा मिश्रित प्रतिबेदन तयार पारीएको थियो | प्रतिबेदनको सम्पूर्ण लेखाइ सर्वेक्षण र RCA का नतिजा बीच एकरुपत ल्याउन को निम्ती खिचातानी रहेको पाईन्छ | जस्ले गर्दा केही यस्ता नयाँ बिषय हरु पनि उजागर भएका छन् जुन भबिस्य को लागि अनुसन्धान वा विश्लेषणको बिषय बनेको छ |

4. नतिजाहरु

डाटामा रहेको व्यापकता र जिल्लाहरुलाई ३ बिभिन्न समुहमा बिभाजन गरी गरिएको सूचना संकलनले गर्दा नतिजा हरुले नेपालको पश्चिम क्षेत्रमा भाईरहेको केही महत्त्वपूर्ण परिवर्तनहरुलाई उजागर गरेको छ जुन कार्यक्रमको प्रभाब भन्दा प्रिथक छ |

A. मध्य तथा सुदुर पश्चिम क्षेत्रमा भईरहेका परिवर्तनहरु

गरिबी

- सामान्यतया यि क्षेत्रमा गरिबी घटेको छ, यधपि जिल्ला भित्रका केही ठाउँहरुमा गरिबीमा वृद्धि पनि भएको छ (बाजुरा, कालिकोट, अछाम र डोटी)|
- प्रायजसो समुहहरुमा खर्चमा (PMT Consumption) वृद्धि भएको देखिन्छ | यो वृद्धि गरिब समुहहरुमा अझ धेरै भएको देखिन्छ |
- सम्पन्नतामा जातिय र लँगिक् बिभेद रहेको छ (दलित र महिला घरमुली भएका घरहरु सामान्य तया गरीब छन्) |

जोखिम

- अहिले भाईरहेको खडेरी एक बाह्य धक्का हो जसले त्यस क्षेत्रमा धेरै असर गरेको छ | यो मानिसहरुलाई धेरै नै असर गरेको एक महत्त्वपूर्ण परिवर्तन हो |
- यसको कारणले अन्नहरुको उपज कम भएको छ र मानिसहरुले खाने खानाको मात्रामा समेत कमी आएको देखिन्छ |
- खडेरीको सामना गर्न मानिसहरुले बिभिन्न रणनीतिहरु अपनाइ रहेका छन् - बिशेष गरेर अन्न कम उत्पादनको अवस्थालाई मानिसहरुले कम खाना खाएर वा फरक किसिमको खाना खाएर सामना गरी रहेका छन् |

प्रवास

- पुस्तौ देखी यस क्षेत्रका मानिसहरुको लागि प्रबासिनु (बिशेष गरेर भारत) एक महत्वपूर्ण जिबिकोपार्जन को रणनिती रहेको छ | धेरै जसो मानिसहरु कामको खोजी मा बाहिर गएता पनि कतीपय मानिसहरु अन्य करणको लागि पनि बहिरिये का छन् जस्तै, शिक्षा वा सधा का लागि अन्य क्षेत्रमा बसोबास गर्न आदी |
- दुई बर्ष को अन्तरालमा विदेसिने मानिसहरु को दर बिभिन्न समुह मा फरक फरक रहेको छ | कुनै समुह मा घटेको छ भने कुनै मा वृद्धि भएको छ |

जनसांख्यिकी तथा सामाजिक परिवर्तन

- यस क्षेत्रको जनसांख्यिकी बानावट मानिसहरु विदेसिने दर सँग सम्बन्धित छ | जुन परिवारका सदस्यको संख्यामा कमी आएको देखिएको छ त्यो बिशेष गरेर पुरुष हरु बाहिरिनु ले गर्दा हो |
- यो महिला घरमुली हुने वृद्धि दर सँग पनि सम्बन्धित छ | यसको अलावा घरधुरिमा कामदारको कमी (वृद्धहरु मात्र बाँकी हुनु) सँग पनि सम्बन्धित छ |
- ग्रामीण पहुँच कार्यक्रमले प्रभावकारी रूपमा गरीब तथा जोखिममा परेका हरु लाई आफ्नो सडक मर्मत समुह (RMG) मा समेटेको छ | यस्ता समुहहरु मा महिला घरमुली भएका र दलित घरधुरी हरु का सदस्यहरु अरु भन्दा धेरै छन् |

नगद पैसाको खाँचो बड्दै जानु

- यस क्षेत्रमा कारोबार नगदमै हुने गर्दछ जसले गर्दा मनिषहरु खानेकुरा किन्न, मोबाईल को पैसा तिर्न, बिजुलीको बिल तिर्न र बच्चा हरुको स्कुलको फीस तिर्न नगद पैसा मै अश्रित छन् |
- धेरै जसो समुह का घरधुरीहरुको बच्चाको शिक्षामा खर्च बढेको देखिन्छ |

B. प्रत्यक्ष लाभांवितहरु मा कार्यक्रमको प्रभाब

सडक खन्ने समुहको गरिबीजोखिममा प्रभाब

- सडक खन्ने समुह (RBG) का सदस्यहरु जो २ बर्ष सम्म समुहमा रहे तिनिहरुको आय मा वृद्धि भएको छ | येधपि तिनिहरु अझै पनि गरिबीको रेखा भन्दा तल नै छन् |
- सडक खन्ने समुह (बर्ा) का सदस्यहरु खडेरी को प्रभाब बाट अरु भन्दा (जो कार्यक्रमको लाभार्थी होइनन) कम जोखिममा छन् | खध्य बिभिदिकरण जुन कमी आएको छ त्यो RBG का सदस्यहरुमा कम छ, जुन कार्यक्रमको ज्यलाको प्रभाब हो |

आय र वचत

- कार्यक्रमको प्रभाबले गर्दा RBG/RMG का सदस्यहरुको आय गैर लाभार्थीको भन्दा वृद्धि भएको छ |
- RBG का सदस्यहरुको आय लग्भग उस्तै छ जुन कार्यक्रमले उपलब्ध गराएको रोज्गारीले गर्दा हो | जबकी अरु समुहका सदस्यहरुको आय स्रोत घटेको देखिन्छ |
- RBG सदस्यहरुको कुल आयमा रेमिट्यान्सको योगदान घटेको देखिन्छ जबकि त्यस क्षेत्रका मानिसहरु को average आय भन्दा median आय बढी देखिन्छ |
- ७२% प्रतिशत RBG का सदस्य हरु वचत समुह मा अबद्ध छन्, यसलाई के मन्न सकिन्छ भने सबै सदस्यहरु वचत समुहमा छैनन जुन कार्यक्रमको वाध्यकारी निती हो |
- RBG का सदस्यहरुको median वचत गैर लाभार्थीको भन्दा धेरै छ |

स्वास्थ्य

- अरु समुहका सदस्यहरु भन्दा RBG र RMG का सदस्यहरु रोगको उपचारमा बढी पैसा खर्च गर्दछन |
- स्थानिय स्तरमा रहेका औषधी पसलहरुमा औषधी किन्ने प्रचलन बढेको छ जुन स्वास्थ्य संस्थामै गई औषधी किन्नु को बिकल्प हो |

शिक्षा

- सडक खन्ने क्षेत्रका मानिसहरु जो RBG सँग आबद्ध छन् उनिहरु ले RBG सँग आबद्ध नभएकाहरु को तुलनामा शिक्षामा धेरै खर्च गरेका छन् |

सम्पत्ति

- अन्य समुहहरुको तुलनामा RBG का सदस्यहरुले धेरै उपभोग्य सम्पत्ति जोडेका छन् |
- RMG का सदस्यहरुले उत्पादक मुलक सम्पत्ति धेरै जोडेका छन् | तर RBG सदस्यहरुको हकमा यो सत्य होइन |

C. सेवाहरूमा सी पहुँच

सडक र परिवहन प्रयोग

- सडक मर्मत गरिने क्षेत्रहरु मा बिशेष गरेर जो सडक बाट नजिक छन् उनिहरुले सडकको प्रयोग बढी गरेका छन् |
- सडक को धेरै प्रयोग अछाममा भएको छ |

- धेरै मानिसहरु को धारणामा कार्यक्रमले गरेको सडक मर्मतको कामले सडकको अवस्थामा सुधार आएको छ |
- एक दिन भन्दा बढीको यात्रामा औसत भाडा मा वृद्धि भएको छ, सन २०१४ बाट २०१६ मा औसत भाडा दुई गुनाले बढेको छ | ५ घण्टा भन्दा थोरै को यात्रामा भने भाडा लगभग उस्तै छ |

सामाजिक सेवामा पहुँच

- स्कूल, स्वास्थ्य संस्था वा गाविस/जिल्ला सदरमुकाम को पहुँच मा कुनै परिवर्तन भएको छैन । तर त्यहाँ को सेवाहरूको गुणस्तर मा वृद्धि भएको छ भन्ने एक समग्र धारणा थियो।
- Baseline मा भन्दा Midline मा स्वास्थ्य संस्थाको प्रयोग बढेको छ र यो दुबै (नजिक र टाढा) समुहहरु मा लागु हुन्छ | स्वास्थ्य संस्था कहिले पनि प्रोयोग गर्दिन भन्ने घरधुरीहरु को प्रतिशत सडक मर्मत गर्ने क्षेत्रको टाढाको समुह मा १०% बाट ६% मा आएको छ भन्ने नजिकको समुह को हकमा १२% बाट २% मा आएको छ |
- उपचरको लागि सरकारी स्वास्थ्य संस्था भन्दा औषधी पसलहरू प्राथमिकतामा रहेको पाइयो |

आर्थिक सेवाहरूमा पहुँच

- त्यस क्षेत्रमा स्थानीय पसल, agrovets र कृषि केन्द्रको पहुँच मा कुनै परिवर्तन भएको छैन |
- स्थानीय पसलहरूमा को गुणस्तरमा अलिकति वृद्धि भएको छ। सन २०१६ को सर्वेक्षणमा मर्मत क्षेत्रको नजिक समुहमा का सदस्यमध्य २५% ले स्थानीय पसलहरू को गुणस्तरलाई 'राम्रो' भनेका थिए जुन सन २०१४ मा सोही समुहका सदस्यहरु मध्य १६% ले मात्रै 'राम्रो' भनेका थिए | साथै भित्री समुहका सदस्य मध्य २०% ले 'राम्रो' भनेका थिए जुन सन २०१४ मा १३% मात्रै थियो |
- कृषि सेवा केन्द्र को प्रयोगमा वृद्धि भएको छ ।

स्थानीय उद्योग र आर्थिक गतिविधि

- सडक निर्माण जिल्ला हरुमा सन २०१४ को तुलनामा २०१६ मा आफ्नो ब्यवसाय सन्चालन गर्ने घरधुरीहरु को संख्यामा नाटकीय रुपमा कमी आएको छ | तर मर्मत जिल्ला हरुमा भने यो संख्या तुलनात्मक रुपमा करीब करीब उस्तै छ |
- आफ्नो ब्यवसाय सन्चालन गर्ने घरधुरीहरु फरक भएका छन् | मर्मत जिल्लाहरु मा र नजिक निर्माण समुहहरु मा सन २०१६ मा आफ्नो ब्यवसाय सन्चालन गरिरहेका हरुले सन २०१४ मा गरेका थिएनन | साथै सन २०१४ मा आफ्नो ब्यवसाय सन्चालन गर्ने हरुले हाल आएर आफ्नो ब्यवसाय सन्चालन गरेका छैनन |

D. RAP-3 को सामाजिक र आर्थिक विकास कम्पोनेन्टको प्रभाब

गरिबीमा परेको प्रभाब

- कार्यक्रमको यस कम्पोनेन्ट ले गरिबी घटाऊन वा खर्च (PMT) मा कुनै प्रभाब पारेको छैन |

Summary assessment of theory of change

An assessment of how impact observed at the midline matches the RAP theory of change (ToC) based on the evidence and findings detailed in the main body of this report is provided here. It should be stressed that evidence presented in the midline is only applicable up to the time the assessment took place (mid-2016) and therefore midway through programme implementation. Whilst it is recognised that certain impacts require a much longer time period to manifest (e.g. impact of roads on market activity, etc.), certain assessment can be made of the progress so far and how well it fits against the ToC.

A) In the context of Mid and Far-West Nepal, the provision of increased access to remote and geographically excluded communities, combined with short-term income sources, is an essential step in lifting people out of poverty

Poverty across the Mid and Far West as measured by the Proxy Means Test (PMT) and Progress out of Poverty Index (PPI) shows a general trend of convergence towards the poverty line, with some 'pockets' in the region that are lagging and in some instances becoming worse off than two years ago. As a general trend, non-beneficiaries are catching up as quickly as direct RAP beneficiaries in socio-economic terms, implying inconclusive evidence of the demonstrable and attributable impact of RAP3 on direct poverty reduction at this point in time.

Social transfers in terms of free education and primary health care programmes implemented by the Government of Nepal are examples of effects beyond RAP that have an impact in the region in general. Education, health and reduction in family sizes owing to increased out-migration seem to have played an important role in the PMT model and are not directly attributable to RAP. The increasing requirement for cash to pay for goods and services is another factor driving change in the region.

Reduction in poverty and vulnerability

The ToC for RAP assumes that wage earnings will translate into improved food security and reinvested in productive assets by direct beneficiaries. In the short term, direct beneficiaries are expected to demonstrate '*increased capacity and propensity to save and invest in prioritised areas for each household (e.g. children's education, small business, etc.)'* and therefore towards *'successful conversion of short-term incomes for investment in food security, assets (productive or non-productive) and education'*. This statement in the ToC is assumed to lead to reduction in poverty in the Mid and Far West. The revised ToC also includes the term vulnerability.

The evidence generated from the midline survey is mixed and does not provide conclusive evidence that this assumption holds true at this time. Direct RAP beneficiaries of road building groups (RBG) appear to have been better off at the baseline and overall see no change in terms of their poverty status (neither better nor worse off). For beneficiaries of RBGs that have remained part of RAP for the last two years, there is evidence to show that their poverty status has improved, although not enough to cross a poverty-threshold. Direct RAP beneficiaries of Road Maintenance Groups (RMG) on the other hand are generally poorer and contain significant numbers of vulnerable groups, and seem to becoming worse off over time. This may be due to trade-offs that members of RMGs make in order to participate in RAP work.

The evidence from the midline shows that people do make a shift towards investing in food security and their children's education. The main takeaway of the impact from short-term incomes from RAP is that the wage earnings provide a cushion for direct beneficiaries to cope with shocks (e.g. the drought in 2015/2016 in the region). It is also important to note that the dietary diversity of direct beneficiaries compared with non-beneficiaries, remained more diverse during the drought, which could be attributable to regular wage earnings from RAP which expands the ability to purchase food

during the shock. Given the increasing need for cash to pay for goods, including food purchases, this tallies up with what people say matters to them. This incremental change seems to have taken place despite the fact that RMG beneficiaries are employed for about 120 days in a year and significantly more employment days for the RBG members. The programme is less likely to have a 'transformational change' impact at the household level but more as a safety net for consumption smoothing and hence can be seen to reduce vulnerability against shocks.

From the perspective of the benefits of short-term incomes for direct beneficiaries, stakeholders may need to moderate their expectations from the programme in terms of people lifted out of poverty by RAP. Seeing the programme as a safety net that reduces the number of people *falling into* poverty and reducing vulnerability to shocks is another way to see the impact of wages and the thrust of the labour-intensive approach to road works. However, the sustainability of these effects should be probed going forward to ensure maximum impact. In addition, those who participate in RAP groups full time (over the last two years) see the most benefits in terms of both reduction in poverty and vulnerability.

Pro-poor labour-intensive approaches

Related to this argument is an emergent evaluation question related to the impact of 30 days of minimum employment days for Karnali Employment Programme (KEP) beneficiaries to cope with the shocks, with the caveat that KEP was not directly assessed by the midline survey. However, emerging findings from the survey could also be extrapolated for KEP since RAP and KEP beneficiaries overlap at times and they are assumed to share similar socio-economic characteristics. The KEP short-term and long-term assumptions are towards developing a food safety net for the poor households resulting from wage employment. If the 7 days food consumption score of the RAP direct beneficiaries, who are employed for significant days in a year, is taken as a proxy indicator, then the impact of minimum of 30 days of KEP employment is less likely to support the direct beneficiaries to cope with distress (e.g. drought).

Access

The ToC assumes that access to basic services for all who benefit from the road will improve as a result of new road construction and improved maintenance activities. The evidence from the midline shows that access to basic services – such as enrolment in primary education of school-age children, vaccination cycle completion, access to VDC services and agriculture services at the local level – has increased across all the sampling domains. It is too early in the programme cycle to assess the impact of improved road connectivity but early signs show that this assumption in the theory of change is strong and should be reassessed at the endline to assess further improvements. However, it should also be noted that improved access to basic services may not be entirely attributable to RAP since many improvements in health service seeking behaviour could be a result of other Government of Nepal initiatives. However, the conditions for improved access via roads can be seen as positive so far.

B) However, roads and other transport infrastructure alone are not enough. Positive change is sought through an integrated approach that addresses other development needs, and together these can multiply the effects beyond single initiatives

As unearthed by the midline, very few households are involved in enterprise activities but those who are earn a significant portion of their household earnings from these activities in scattered locations across the region. It supports the macro-context analysis of the region, which points towards an increasing 'local-urbanisation' phenomenon taking place across 'isolated pockets' across the region. This could create a positive environment for self-employment and small enterprise creation to address burgeoning demand for relatively high value products such as dairy, early season vegetables, etc. At

this time, the value chain development activities planned by the Connect component in different core districts could have a potential to take off if the emergent findings are taken into account.

However, evidence from the midline shows that the Social and Economic Development (SED) sub-component of RAP had almost no impact for those who participated in its activities. Whilst this component may not have delivered in terms of longer term outcomes and impact, the above paragraph notes that there are opportunities for further positive change and stimulus of economic activities in the region and that they may be found in very specific pockets in the region.

Abbreviations

CBS	Central Bureau of Statistics
DFID	UK Department for International Development
FCS	Food Consumption Score
GLLAMM	Generalized Linear Latent and Mixed Models
HH	Households
KEP	Karnali Employment Programme
MEL	Monitoring, Evaluation and Learning Component of RAP
NLSS	Nepal Living Standard Survey
NPC	National Planning Commission
NPR	Nepali Rupee
ODK	Open Data Kit
PMT	Proxy Means Test
PPI	Progress out of Poverty Index
PSU	Primary Sample Unit
RAP	Rural Access Programme
RBG	Road Building Group
RCA	Reality Check Approach
RMG	Road Maintenance Group
SED	Social and Economic Development
SOLI	Standard of Living Index
TLU	Tropical Livestock Unit
ToC	Theory of Change
VDC	Village Development Committee
WB	World Bank
WFP	World Food Programme

Section A: Introduction

1. Purpose and structure of the report

This midline report presents the findings from a panel survey of 3,600 households (HH) in eight districts in the Mid and Far West of Nepal and an in-depth qualitative participatory study called the Reality Check Approach (RCA) in four of these eight districts. This mixed-methods approach was conducted in mid-2016, precisely two years after the baseline in mid-2014.[1] The report compares the findings from the baseline and midline to provide a longitudinal analysis of changes in this region as well as an objective assessment of the impact of the third phase of the DFID's Rural Access Programme 3 (RAP3).[2]

The data from the two panel surveys (baseline and midline) presents probably the most comprehensive dataset ever generated about the livelihoods of people living in the region. Together with the RCA, which helps to explain findings from the household survey, the midline findings presented represent a rich quantitative and qualitative analysis of an understudied region of the country. To provide a contrast, the most recent national poverty survey, the Nepal Living Standards Survey 3 (NLSS-III), had a sample size of 660 households in the Mid and Far West of which only 240 households were within the eight RAP districts. Hence the evidence from the midline, both as a snapshot of the scenario now as well as a comparison of change from two years ago, will increase understanding of the influences of poverty in the region. It is anticipated that the data will be amenable to significant further analysis – both by RAP and by other stakeholders.

The report is structured as follows:

- **Section A:** Provides an introduction to RAP3 and its independent Monitoring, Evaluation and Learning (MEL) component, and sets out the midline purpose and process.
- **Section B:** Presents the RAP3 theory of change. As a result of the learning generated from programme implementation experience and MEL studies in the two years since the baseline, a revised theory of change was developed in mid-2016.
- **Section C:** Summarises the design of the survey and the methods employed.
- **Section D:** Presents the findings from the midline. This section contains analysis of overall socio-economic change in the region, the impact of RAP on direct beneficiaries of its interventions, and the effects of changes in access as a result of RAP3's road works.
- **Section E:** Provides the conclusion and revisits the Theory of Change.
- **Annexes**

2. The Rural Access Programme 3 (RAP3)

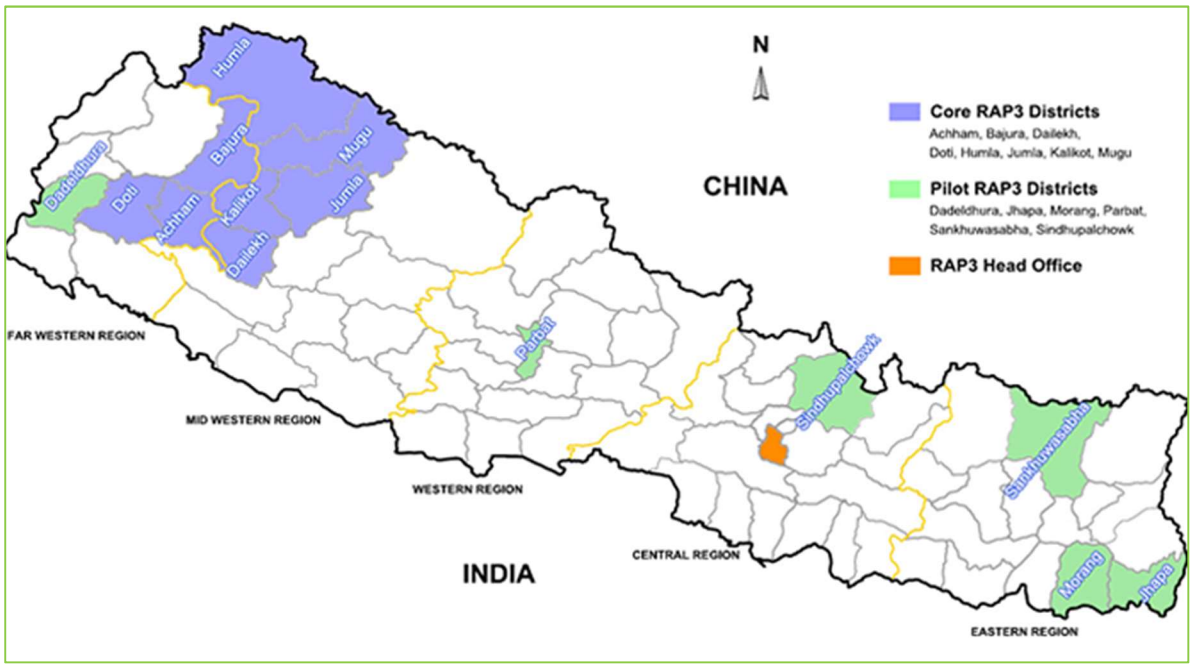
The UK Department for International Development (DFID) has been supporting the Nepal Rural Access Programme (RAP) for the last 15 years. It is currently in its third phase of implementation. The objective of the Rural Access Programme 3 (RAP3) is to reduce poverty in western Nepal. The programme aims to deliver economic benefits to the poor through rural road access and increased connectivity. Sustainable access to markets is expected to stimulate the local economy along the road network. RAP employs a labour-based approach to road work activities and directly employs poor and vulnerable groups in Road Building Groups (RBGs) and Road Maintenance Groups (RMGs). It is expected that targeting the poor and vulnerable for short-term employment will also reduce poverty. A more detailed theory of change for RAP3 is outlined in Section B of the report.

[1] It is also a one-year follow-up to the smaller survey of RMG households conducted in mid-2015. See Annexes.
[2] www.rapnepal.com

RAP3's implementation activities are focused in eight 'core' districts in the Mid and Far West of Nepal, highlighted in the blue shaded districts in the map below. In these eight 'core' districts, RAP concentrates on new construction (or 'build') activities in the four districts of Bajura, Humla, Kalikot and Mugu. In these construction districts RAP is building 97.5km of new fair-weather earthen rural roads. Roads are constructed in 'stages' of track-opening to 2.5m width, then widening to 3.5m width, and finally widening to 4.5m width with full supporting structures in place. As of June 2016, the total track opened has been, 6.6km at 2.5m width, 17.5km at 3.5m width and 18.8km at the full 4.5m width.[3]

RAP concentrates on 'maintenance' activities in the remaining four districts of Achham, Dailekh, Doti and Jumla. In these maintenance districts RAP is maintaining approximately 2,000km of fair-weather roads with some emergency repairs (usually annually after the monsoon) and minor upgrades. RAP also implements maintenance activities in six other districts across Nepal highlighted in the light green shaded districts on the map. The focus of RAP's core work is in the eight districts in the Mid and Far West and hence the focus of the independent impact assessment of this midline report.

Map 1: RAP working districts



The eight core districts are some of the poorest districts in Nepal. It should be noted that the build districts and maintenance districts have differing levels of access. The build districts generally have a lower level of road density (which explains RAP's focus on new construction work in these districts) and lower access, whereas the maintenance districts are relatively better served by rural roads. It is anticipated that the full benefits of new access in the new construction districts will only be fully realised once the full widening has been completed along the whole length of the new road. The benefits of maintenance work in the four maintenance districts are expected to be more immediate, through improved road accessibility.

RAP3's approach has evolved since it began in 2013. A significant change has been the cessation of the Social and Economic Development (SED) sub-component of the programme. This component's activities ceased in early 2016 (shortly before the midline) following a number of critical reviews. Hence, the midline report can be seen as a 'de facto endline' for the beneficiaries of the SED component.

[3] RAP3 June 2016 Progress Report

3. RAP3's Monitoring, Evaluation and Learning (MEL) component

Itad has been contracted by DFID to manage an independent Monitoring, Evaluation and Learning (MEL) component for RAP3. Previous phases of RAP did not include a third party MEL component. The MEL component of RAP3 generates knowledge and facilitates learning for the programme and its partners. It does this by providing in-depth analysis on the progress and outcomes of RAP and the contribution that it makes to development. Strong emphasis is placed on partnership – with RAP's implementing agencies and other organisations in Nepal that are involved in associated research or have an interest in using the knowledge that it generates.

The added value of MEL is to look beyond the pre-defined indicators in the programme's Logical Framework to enable a more nuanced understanding of the wider context in which roads are being constructed and maintained, and economic activity is being promoted. In particular, it provides insights into the behaviour, attitudes and political economy that shape the effectiveness of RAP's interventions. The MEL component provides an opportunity to focus dedicated resources and expertise on what is a high profile, large scale, and strategically important programme for DFID, the Government of Nepal, and the large number of poor people that it seeks to support.

4. Midline purpose and process

The baseline had four main purposes: **1)** establish a sample to enable comparison across different domains, **2)** provide a robust analytical base to test the RAP theory of change, **3)** set in place a panel to enable an objective assessment of change in subsequent rounds data collection, and **4)** provide a rich data set specific to an under-researched area of the country.

These main purposes hold true and are just as relevant for the midline. **The midline provides a robust analytical assessment of socio-economic change in the region** and which can be used to test the RAP theory of change.[4] It is important to note that from the outset, the baseline and midline have been viewed as an important tool for not only understanding the progress of RAP3, but also placing this within the broader development scenario of this region of Nepal.

5. How to read this report

This report, together with the more detailed separate Midline RCA report, provides an incredibly rich set of information, and as such may be overwhelming to the reader. Therefore the report has been consciously structured in such a way as to enable users to 'dive' into sections that are most relevant to them. This includes a section of broader changes in the Mid and Far West, changes as a result of RAP activities between beneficiaries and non-beneficiaries (i.e. those involved as RBG or RMG members), and changes as a result of improved access. A small 'de facto endline' section on the SED is also included. It is anticipated that smaller 'bite-size' briefs will be produced focusing on specific findings from the midline. However, the authors of this report encourage the report to be read as a whole in order to fully appreciate the fact that there are complex problems faced by communities in one of the poorest regions of Nepal.

The criteria used for sampling is covered in detail in Section C.2 of the report and Annex 2. However, in order to aid the reader's understanding of the interpretation between the RBG/RMG domain, inner

[4] The RAP-3 theory of change was re-examined in mid-2016. This was revised to take into account coherence across the RAP-3 components but it should be noted that the fundamental assumptions of the theory of change remain similar to the original theory of change. The revised theory of change can be viewed in Section B of the report.

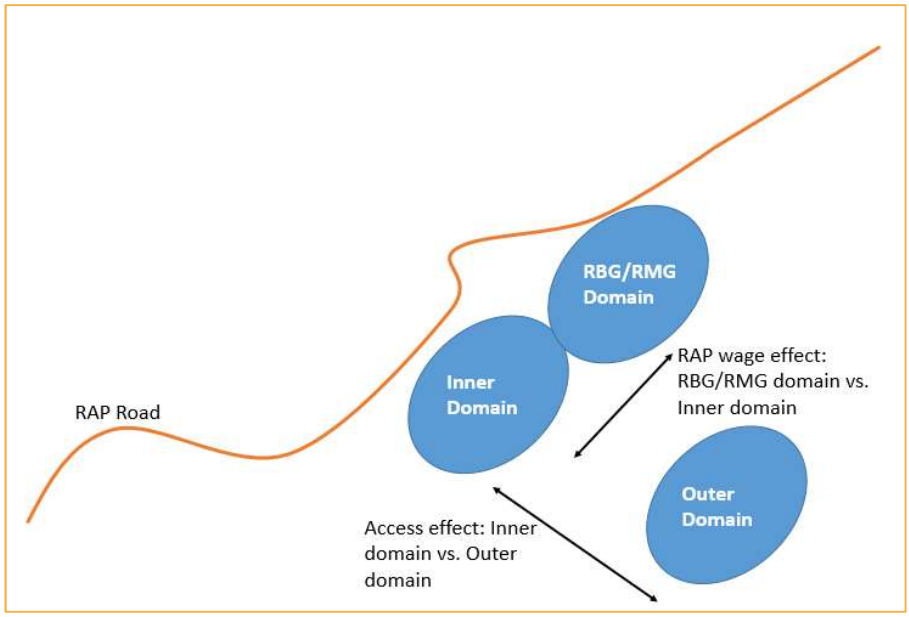
domain and outer domain (sometimes referred to as 'buffers' or 'stratum' in the graphs), a quick and simple explanation is provided here. In short, the intricacy of attributing or contributing impact required a sampling methodology that took account of multiple changes to be assessed over time, between geographic areas and between those directly involved in RAP and those who are not.

In very simple terms, the inner domain refers to **non-direct beneficiaries** of RAP and the RBG/RMG domain refers to **direct RAP beneficiaries** – i.e. members of RBGs and RMGs. The inner domain and RBG/RMG domain can be thought of as a 'control' and 'treatment' group respectively, as they are supposed to represent the same profile of people eligible for direct participation on RAP and who live within a 1.5 hour walk to the RAP road head. Hence the difference between the two groups over time can be attributed to RAP as it is participation in road works and wages received as members of RBGs/RMGs that accounts for the difference between these two domains.

The difference between the inner domain and outer domain is physical and geographical – the inner domain sample represents households close to the road head (less than 1.5 hour walk) whilst the outer domain is far from the road (approximately 3–5 hours walk away from the road head). This sampling strategy allows us to compare the differential impact of improved road access between remote and non-remote populations.

It is important to keep in mind this understanding of sampling groups throughout the report in order to fully grasp the effect of RAP wages, access and the overall context. Figure 1 below provides a diagrammatic sketch of the above explanation. (See Section 2 of Annex 2 for a more comprehensive breakdown of samples.)

Figure 1: Analytical domains for sampling



Section B: RAP3 theory of change

One of the main objectives of the impact assessment is to test the RAP3 theory of change (ToC). The RAP3 ToC was reviewed in mid-2016 to take account of what has been learned since RAP3's inception – both by the programme implementers and the studies undertaken by MEL. The purpose of the review of the RAP3 ToC was to provide an opportunity for stakeholders to reflect and critically review the programme from a holistic perspective. Over the last three years a number of changes have been made to the programme and several reviews and studies commissioned. It was generally recognised that the original ToC was not wholly 'owned' or sufficiently recognised by core stakeholders. In light of the significant learnings and the three-year extension of the RAP-3 programme to 2019, the review came at a key time.

The new version has been considered to provide cohesiveness for the *whole* programme and to better articulates linkages and the interconnectedness of relevant key issues. Whilst the timing of the midline process came too late to inform revisions to the ToC, the analysis contained in this report is intended to assess change and progress to date and to inform the ToC's assumptions. It should be noted that the ToC has not changed *radically* per se and hence, for the purposes of the midline, the old and revised versions are similar enough for the midline assessment to be relevant. This section provides a narrative summary of the theory of change. The full theory of change can be found in Annex 1.

The theory of change is based around three core hypotheses presented below. The midline survey and its analysis is focused on generating evidence to assess the first two.

1. ***In the context of Mid and Far-West Nepal, the provision of increased access to remote and geographically excluded communities, combined with short-term income sources, is an essential step in lifting people out of poverty***

    - Increasing access to markets, services and employment opportunities has been proven to help lift people out of poverty. The most significant changes for households are in time and cost savings for those benefitting, along with income through wage labour provided through road building and maintenance groups.
    - In most cases, this will probably result only in short-term (but valuable) gains for these households that translate to improved household food and income security. However, there is an assumption that some of these households will be able to use this income to invest in securing improved longer-term income security through the purchase of assets or setting up small businesses.
    - It is assumed that people living in the road 'corridor' – whether or not directly engaging in RAP3 interventions – will also benefit from the improved access and local economic stimulation brought about by improved road infrastructure.

2. ***However, roads and other transport infrastructure alone are not enough. Positive change is sought through an integrated approach that addresses other development needs, and together these can multiply the effects beyond single initiatives***

    - RAP3 has evolved and learned that building in initiatives and investment in complementary social and economic development (SED) activities can multiply the effects of the improved access generated through new or improved transport infrastructure. The SED activities have now ceased although a new component called Connect seems to pick up where SED left off. The main difference is that this component no longer directly targets the poor as producers and instead takes a dual approach of top-down and bottom-up market stimulation.

- The programme recognises that there must be equal access for women and traditionally excluded groups as these make up the majority of the poorest, and they will be targeted by all interventions. It is assumed that income and opportunity gains will contribute, even if modestly, to individuals gaining greater economic power and autonomy within their households and the community – and that these gains are sustainable.

3. ***The scale and sustainability of change depends on strong linkages between RAP3 and market development activities. It is recognised that the programme is not working in isolation in the Mid and Far West and many other initiatives are working on rural infrastructure and socio-economic development***

- RAP contributes to the definition of district government priorities (such as the District Transport Master Plans) and ensures its work conforms to, and informs, these. RAP will also channel funding to road maintenance schemes, provide technical oversight and monitoring, and invest in building capacity of government and private sector actors.

- The sustainability of the benefits of RAP's work in such difficult rural terrains will depend on other actors. A key assumption, perhaps particularly in road maintenance work, is that government and other actors will be receptive to a successfully delivered model, and be willing to revise policy and practice in areas such as priority setting for road maintenance, improvement and building. The Government will need to ensure the sustainable resourcing of these.

Section C: Survey design and methods[5]

1. Questionnaire design

The survey questionnaire was designed with a view to capturing a wide range of hypothesised results of RAP3, including those noted in the table below, which are derived from the RAP3 theory of change (see Section B). The survey was also designed to ensure adequate coverage of RAP3's logframe indicators. The midline survey was functionally very similar to both the baseline and RMG surveys conducted in May 2014 and May 2015 respectively. Some additional sections were added to the questionnaire to cover recent shocks in the region leading up to the enumeration in May 2016 – the fuel crisis and the drought.

Table 1: Hypothesised effects of RAP3 intervention

• Reduced transport cost for passengers	• Reduced distress migration
• Increased household income (both short and longer term)	• Increased non-distress migration
• Increased household income diversity	• Reduced cost of credit / greater diversity of institutions offering credit resulting in lower interest rates
• Increased added value from primary producers income	
• Improved nutritional status/food diversity	• Increased female and excluded group participation in the labour force and household decision-making
• Increased school enrolment and attendance	• Increased household spending on asset creation activities
• Improved immunisation rates	• Increased non-farm employment activities
• Increased utilisation of health facilities and other government services	• Increased utilisation of improved agricultural technology and agriculture and livestock service centres

The design used the Nepal Living Standards Survey 3 (NLSS-III, 2010–11) as a starting point, ensuring a large degree of consistency of definitions with national statistics, whilst stripping out some of the detailed sections of the NLSS that were not of interest in this case. This should ensure comparability of RAP3's indicators with existing and future rounds of the NLSS.

As well as the above considerations, the survey sought to capture any potential negative impacts that road construction and maintenance might bring to a region. The inclusion of this module was motivated by the findings of the pilot **Reality Check Approach (RCA)** (see Section C.6 below), conducted in November 2013, which highlighted perceptions of the socio-economic strain relating to increasing modernisation and migration brought about by improved road networks.

2. Measuring Poverty

Due to the difficulties of gathering accurate estimates of income from household surveys (due to multiple income sources, inaccuracies in recollection of past income, sensitivities around sharing income information and so forth), the survey goes beyond income estimates to construct a composite

[5] Further detail on the household survey methodology is provided in Annex 2.

indicator of consumption using a **proxy means test (PMT)** approach. This uses information from NLSS-III to model household consumption upon a range of explanatory variables, including health, education, demography, housing and assets. Through the development of a composite indicator under the PMT approach, we are able to gather a **multidimensional understanding** of the drivers of household consumption that goes beyond our income estimates, and provides a more nuanced perspective on household poverty.

The team considered developing a separate Standard of Living Index (SOLI) in addition to the above, but has decided not to do so at this point, due to technical complications in determining the weightings of such an index. A more complete discussion around the PMT and the SOLI is provided in Annex 2.

3. Sampling

The baseline survey was conducted in RAP's four road construction districts (Humla, Mugu, Bajura and Kalikot) and four road maintenance districts (Doti, Achham, Dailekh and Jumla). In general, the maintenance districts currently have far less road infrastructure than the build districts, which is a useful basis for comparison at baseline, as well as being of value in assessing change over time as RAP and others invest in road construction in the construction districts.

Four 'direct beneficiary' groups were surveyed at the both the baseline and midline surveys – the beneficiaries of the social and economic development (SED) interventions in both the building and maintenance districts, and the road building groups (RBGs) and the road maintenance groups (RMG).

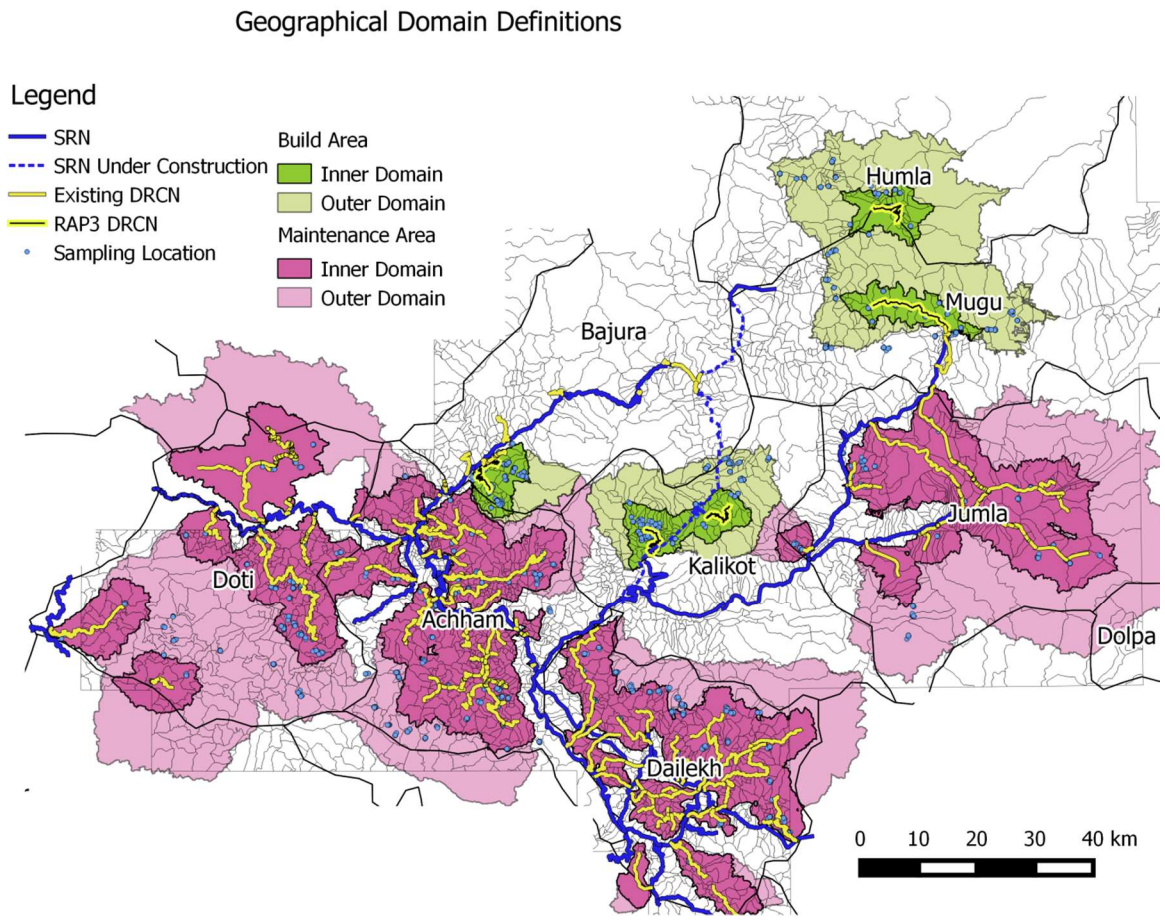
Furthermore, in order to give a richer picture of the different impacts of RAP, and help place this within broader change, 'buffer zones' were drawn up around the relevant roads, with sampling of households in 'inner buffers' containing 'indirect beneficiaries' living within 1.5 hours' walking distance of a RAP road. These households are not benefitting directly from road building or SED activities but one may see change over time through increased access and ripple/spin-off benefits such as better access to markets and services and opportunities from these stimulating the local economy. Households living in 'outer buffer zones' – those living up to 5 hours' walk from the road – were also sampled. This was done so that a further comparison group in these more remote areas could be studied to determine if any change was taking place for them as a result of activities in the inner zones. Given the relative extent of the maintained RAP road network this provides a sample frame which covers the majority (but not all) of the population in Doti, Achham, Dailekh and Jumla but only subsets of the population within the build districts of Bajura, Kalikot, Mugu and Humla. The geographic extent of these domains is seen in Figure 2.

At baseline, sampling from these geographic domains was done randomly across the entire population within these regions. As a result, the inner and outer domains do include direct beneficiaries of the RAP project (RBG and RMG members). The proportion of RBG and RMG members within these sampling domains will reflect the proportion of RBG and RMG members within these wider areas. Given the size of the road building project relative to the population within the four build districts, a large proportion of the inner build buffer households contain RBG members, just under half of inner build domain households contained an RBG member. This was particularly the case in Humla, where 83% of households within the inner buffer domain also contained RBG members at the midline survey, and Mugu (50% of inner buffer households in RBG). In Bajura only 11% of households in the build inner contained an RBG member whilst in Kalikot it was 22%.

Table 2: Percentage of households receiving income from RAP

Domain	Households receiving direct income from RAP construction or maintenance - 2015/16	Households receiving direct income from RAP construction or maintenance – 2013/14	Households receiving direct income from RAP construction or maintenance (Baseline or Midline)
Build – RBG	89%	90%	98%
Build – Inner	45%	23%	47%
Build – Outer	4%	1%	4%
Build – SED	86%	91%	98%
Maintenance – RMG	98%	100%*	100%
Maintenance – Inner	4%	8%	12%
Maintenance – Outer	6%	0%	6%
Maintenance – SED	8%	7%	15%

Figure 2: Detailed geographical domain definitions in build (green) and maintenance (purple) areas



This gives a total of eight sampling domains – the inner, outer and SED cohorts of both the road building and road maintenance districts (six domains in total), plus the RBGs and RMGs. At the time of the baseline survey the process of identifying households to participate in the RMGs had not been completed. This means that the RMG baseline was conducted one year later than the baseline for the other 7 domains, in May 2015 rather than May 2014. This means care needs to be taken when comparing the differences between the RMG groups and the corresponding inner buffer households, as there is an element of time involved as well as a potential group effect.

Including the RMG group a total of 3,622 households were surveyed at baseline. Of these, 3,255 (90%) were successfully located and re-interviewed for the midline survey. No replacements of households were conducted for those who could not be located. The hypothesised panel attrition rate in the sample size calculations was 13% (reduced down from 20% due to constraints) – so this is within the range that was expected. Full details of the sampling methodology, and sample size calculations, are provided in Annex 2.

The survey specifically included SED groups based on data received from RAP. The total membership of RAP SED groups was given as 1,500 in build areas and 6,500 in maintenance areas. 55% of the sample of maintenance SED members were former RBG members compared with 18% in inner buffer.

The composition of the SED groups provided an over-representation of members of RBG households as compared with the general population. This is particularly apparent in the baseline survey area where 91% of SED households indicated that they had received money directly from RAP construction or maintenance activities. This is almost identical and in fact slightly higher than the proportion receiving income within the RBG domain. As such the best comparison group for the SED interventions in the build area is the RBG domain rather than the inner buffer domain, as a comparison between SED and inner buffer would be dominated by any effects from the RAP building wages.

However, this is not the case for the maintenance domains. At the baseline survey the proportions of households who had received income from RAP was very similar for both inner maintenance and SED domains. These people are mostly recording some spillover wages from the end of the RAP2 building phase rather than the current RAP3 maintenance phase.

There does seem to be a difference in those directly participating in RAP at the midline, with 8% of SED member households reporting that they had received income from RAP compared with only 4% in the inner maintenance domain. There is very little overlap between households who received RAP income in these domains at the baseline survey with those who received income at the midline survey. In addition, within both of these domains, there is an even split between households with a member travelling to work in the RBG in the build area and those participating in the RMGs within their own districts. This implies that there is some degree of local travel to participate in this road building project, particularly from Dailekh. The over-representation of the SED member households relative to the general inner buffer households in the ongoing RAP3 work, may potentially be due to increased awareness of the employment opportunities.

4. Analysis methods

Estimates presented at the domain level are weighted according to the sampling probabilities of each household, estimated from approximations of the population size within the buffer domains and from member listings in the SED, RBG and RMG domains. Error bars presented on graphs represent 95% confidence intervals around estimates. A variety of different statistical methods is used in the analysis of this data. Unless otherwise specified in the text of the report the methods used are summarised in Table 3. **A ‘p value’ of less than 0.05 is used to define statistical significance**.

Table 3: Methods of statistical analysis

Comparison	Numeric Variable	Binary Variable
Within group **Baseline vs Midline**	Linear mixed effects regression determining whether change in variable is significantly different from zero. Nested random effects included for 'cluster' and 'district'.	McNemar's test
Between group **Midline vs Midline** **Baseline vs Baseline**	Linear mixed effects regression determining whether variable in groups is significantly different from each other. Nested random effects included for 'cluster' and 'district'.	Chi-square test
Between-Within **'Difference-in-difference'** **(Interaction effect)**	Longitudinal linear mixed effects regression determining whether the interaction between group and time is significantly different from zero (i.e. whether the change over time is different between the groups). Nested random effects for 'household' 'cluster' and 'district'.	Longitudinal generalised linear mixed effects regression using probit transformation of outcome to determine whether the interaction between group and time is significantly different from zero (i.e. whether the change over time is different between the groups). Nested random effects for 'household' 'cluster' and 'district'.

Interpolated maps are produced for some indicators showing the spatial spread of results across the study region. Using these maps to obtain precise estimates for a particular geographic location is not advisable, given that the density of sampling locations varies substantially in different regions. Rather these maps should be used to detect 'hot-spots' of particular locales where outcomes are somewhat different from the expected values. Care should be taken in interpreting these maps in areas that are either sparsely or densely sampled. Sparsely sampled locations can result in estimates from a small number of households being used as the basis for predictions of a very wide area. Densely sampled locations can result in a 'regression-to-the-mean' effect where any spatial effects that may exist might be at a more localised level than the model is able to detect.

These are calculated using **kriging methodology**, a statistical technique used to interpolate geo-referenced data onto a wider gridded area. These models are fitted using calculated variogram models with parameters estimated from the geographic spread of the data. The interpolated maps only include responses from the inner and outer buffer domains, to use an approximately representative sample of the study region.

5. Digital data collection

'*Smartphones are rapidly becoming the platform of choice for deploying data collection and information services in the developing world. They have quickly leap-frogged desktop and laptop computers due to their mobility, increased independence from the power infrastructure, ability to be connected to the internet via cellular networks, and relatively intuitive user interfaces enabling well-targeted applications for a variety of domains*.'[6]

Smart phones were used by enumerators to record survey data and Open Data Kit (ODK) was used as the digital data collection platform for the household survey. As the midline and endline surveys are returning to the same households, the recording of individual household geo-references along with photographs has helped in identifying household structures and household members and was an important component of ensuring accurate household re-identification.

Other advantages of using ODK to record survey data included the following:

- Face-to-face training time was no longer than traditional training with paper-based questionnaires. While the ODK form should not be a substitute for enumerator understanding of the questions and the questionnaire logic, the form automatically implements this logic, requiring less decision-making, and therefore less potential for errors on the part of the enumerator during enumeration.
- Supervisory load is reduced with an ODK form developed with all possible data validation logic built into it. This is because the enumerator has no choice but to follow questionnaire logic and capture responses within appropriate ranges, etc.
- The cost of buying an android device (and SD card to facilitate local backup during enumeration) for each enumerator was offset against the cost of data entry for each survey round, reduced supervision costs and expected higher quality of data plus completeness of identification to assist re-identification of panel households, i.e. geo-references and associated photographs with minimal extra data management, without recourse to having to buy GPS devices or cameras.
- Android devices that are capable of taking an SD card were used because having an SD card enables local backups of completed forms to be made. This is particularly useful if the android devices are going to operate off-line for extended periods, which was often the case in the remote mountain areas of western Nepal. In such a situation, the breakage or loss of the cell phone would incur significant data loss. Each day, the enumerator could back up the ODK directory from the internal phone memory to the SD card, remove the SD card and keep it separate from the android device. This provided a significant degree of data security when working off-line for extended periods.
- Using Wi-Fi in offices for uploading to the ODK aggregate server combined with local daily SD card backup was a substitute for enabling the android devices to have mobile data services, which were often inaccessible in many of the RAP 3 survey areas.

[6] Open Data Kit 2.0: Expanding and Refining Information Services for Developing Regions; Waylon Brunette, Mitchell Sundt, Nicola Dell, Rohit Chaudhri, Nathan Breit, Gaetano Borriello; Department of Computer Science and Engineering, University of Washington. Paper presented at 14th International Workshop on Mobile Computing Systems and Applications; February 2013 http://www.hotmobile.org/2013/papers/full/2.pdf

6. Reality Check Approach

The Reality Check Approach (RCA)[7] has gained international recognition and uptake as an efficient and effective means to gather the insights and perspectives of people directly experiencing the issues under study. It is a qualitative research approach which extends the tradition of listening studies (see Salmen 1998 and Anderson, Brown and Jean 2012)[8] and beneficiary assessments (see SDC 2013)[9] by combining elements of these approaches with researchers actually living with people whose views are being sought. RCA is sometimes likened to a 'light touch participant observation' but differs by being comparatively quick and placing more emphasis on informal, relaxed and insightful conversations than on observing behaviour and the complexities of relationships.

Important elements are that (i) RCA is deliberately not theory-based so there are no preconceived research frameworks or research questions allowing emic (insider) perspectives to emerge and limit etic (outsider) interpretation or validation; (ii) RCA researchers are independent and make this explicit with the people who participate in the study; (iii) RCA researchers live with families joining in their everyday lives and learn from them through informal conversations, observations and direct experience. The purpose of the RCA is to provide rich and deep description and people's own insights which are surfaced by spending a comparatively longer time with them, by diminishing power distance between the families and the researcher and by extensive triangulation of the insights through interaction with all members of the family, their neighbours, and those they interact with including service providers over four days and nights.

This Midline RCA study follows a Scoping Study conducted in December 2013 in Kalikot and Dailekh (which was used to help design some elements of the Household Survey Questionnaire and provided insights into how the survey could be best administered) and the Baseline Study conducted in May 2014. The Baseline RCA, like the Midline RCA, was undertaken to enrich the Household Survey by providing people's own insights. The study takes place in three 'build' locations (two villages in Bajura and one in Humla) and three 'maintenance' locations (one in Achham and two in Doti). The six study villages were selected within the 'inner buffer zone' (i.e. within 1.5 hours walk of the RAP road). The 25 families with whom the researchers lived were identified at the baseline through informal conversations with people in the villages and were those fulfilling RAP target beneficiary criteria, especially those who were considered to be comparatively poor and had different generations living in the same house including school age-children.

The Midline RCA study conducted in April 2016 involved most of the same RCA team returning to families with whom they had stayed in 2014. Just one family had to be dropped so the midline team returned to spend four days and nights with 24 families. The RCA team had further purposive and in-depth conversations with over 900 people including RAP group members, family neighbours, service providers, kiosk owners, local leaders and others. The main theme of conversations was 'change', for the purpose of understanding how people themselves view the changes that had occurred since the team last visited two years before.

The full Midline RCA Report is available as a separate report.

[7] Originally developed in 2007 in Bangladesh with the Embassy of Sweden.

[8] Salmen, Lawrence F., 1998, 'Towards a Listening Bank: Review of best Practices and Efficacy of Beneficiary Assessments' *Social Development Papers* 23, Washington World Bank; Anderson, Mary B., Dayna Brown, Isabella Jean, 2012, 'Time to Listen: Hearing People on the Receiving End of International Aid, Cambridge, MA: CDA.

[9] SDC; Shutt, Cathy and Laurent Ruedin, 2013, SDC How-to-Note Beneficiary Assessment, Berne: Swiss Agency for Development Co-operation.

7. Synthesising the findings

To produce a mixed-methods report it was essential that the quantitative and qualitative study teams came together to analyse and interpret the findings. This has been a conscious choice throughout the impact assessment, stemming from the design of the original baseline questionnaire whereby a pilot RCA was conducted in order to inform the survey design. For the baseline, a separate RCA report was produced in parallel with the main baseline report. This main baseline report then included case studies from the Baseline RCA report.

For the midline, it was decided that the quantitative and qualitative findings could be further integrated to produce a more insightful and nuanced mixed-methods report. For this reason the quantitative and qualitative study teams came together for a two-day workshop to interpret and analyse the findings. Throughout the write-up of the report, there has been an iterative process of circulating analyses between the teams, constantly leading to new areas of enquiry where further analysis could be conducted.

Section D: Findings

This section of the report unpacks important and relevant emerging changes in the eight districts of the Mid and Far West of Nepal. The two-year gap between the baseline (2014) and the midline (2016), from a sample of a 3,600 household panel survey and the parallel in-depth qualitative RCA study, provides a unique basis to explore emerging regional changes in this understudied region of the country and provides an objective impact assessment of RAP so far.

The structure of this findings section is as follows:

- **Part 1:** Emerging regional changes in the Mid and Far West context
- **Part 2:** Impact on RAP direct beneficiaries
- **Part 3:** Access to services
- **Part 4:** Impact of Social and Economic Development (SED) sub-component of RAP

A summary of the key findings is provided in a summary box at the beginning of each part of this section of the report. These key findings should be read in conjunction with the main narrative in order to understand this within the broader context of each part of the findings section.

Part 1: Emerging Regional Changes in the Mid and Far West Context

This section is specifically concerned with broader socio-economic and poverty trends across the region, including specific reference to how people in this region have coped with the effects of a drought,[10] lending further consideration to the issue of vulnerability to shocks in the region and peoples' ability to cope and mitigate these shocks. This section examines poverty and vulnerability across the region, highlighting migration trends as well as demographic and social change. The analysis in this section goes beyond isolating RAP effects. The examination of macro social and economic issues provides a picture of contextual change and an enhanced evidence base of the drivers of these changes as a whole.

Summary of Part 1:

The following is a summary of main findings from Part 1 presenting changes that are relevant across the Mid and Far West of Nepal. For further detail on each specific topic, refer to the numbered sections.

Poverty (Part 1.2)

- The general trend across the region is that poverty has reduced slightly since 2014, although certain regions within districts have got poorer (Bajura, Kalikot, Achham, Doti).
- There has been a rise in PMT consumption in most domains. This rise has generally been greater in relatively poorer domains, indicating a degree of convergence.
- There is significant caste and gender variation in wellbeing (Dalits and female-headed households are generally poorer).

Vulnerability (Part 1.3)

- The ongoing drought is an external shock that has impacted across the region; it is one of the most important changes that matter to people.
- It has resulted in lower crop yields and had an impact on food consumption and dietary diversity across all domains (i.e. a fall in food security)
- Households have employed an increasing number of coping strategies to cope with drought – mainly in terms of food coping strategies (lower consumption of food and changes in food types consumed).

Migration (Part 1.4)

- Migration (mainly to India) has been a significant livelihood strategy in the region for generations. Whilst most migrants leave for work, people are also 'moving' out of the region for many other reasons, including for education or permanent relocation to other parts of Nepal.
- Trends in the level of migration in the past two years varies between domains – it has risen in some and fallen in others.

Demography and social change (Part 1.5)

- The demographic make-up of the region is linked with migration trends – an observed reduction in households' size is mainly due to male out-migration.
- This is linked to a sharp increase in female-headed households across the region and a growth in the proportion of labour-constrained households (e.g. old aged) left behind in the region.

[10] The drought has been monitored for some time and for the purposes of the Midline, specific questions were included to uncover the effects. The WFP and Government of Nepal issued an update of the drought in April 2016: http://fscluster.org/sites/default/files/documents/presentation_karnali_drought_for-fsc_8-apr-2016.pdf

- RAP targets the poor and vulnerable effectively in selecting RMG membership; these groups contain a disproportionately high number of female-headed households and Dalits.

Increasing need for cash (Part 1.6)

- The emergence of a cash-based local economy means that people are more reliant on cash for food purchases as well as paying for mobile phone connections, metred electricity connections to fuel a growing desire to spend on children's education.
  Most domains show increased spending on children's education.

1.1 Changes that matter to people

Conversations about the changes felt by people themselves across the Reality Check Approach (RCA) study locations were unprompted and as a result represent what people themselves feel were significant compared with 2014. Understanding what matters to people helps to set the scene for this section of the report on the changing context, by placing connectivity and road building and road maintenance in context with other issues, which people feel are important to them.

The table below provides an indication of the most talked about changes. In all RCA locations (Bajura, Humla, Achham and Doti) the ongoing drought was, without doubt, the most significant issue in people's lives. It has had a number of consequences such as changed diets, shortage of drinking water in some areas and an increasing need for cash to purchase food, which in turn has led in turn to an increased rate of return to work abroad (mostly India) to secure cash income.

Table 4: Most talked about issues when people talked about change since 2014

Most talked about	Drought (and increasing disinterest in farming)
	Increasing reliance on migration for work/return to migrant work
	Electricity
	Increasing need for cash
	Development of market hubs and access to goods to buy
	House renovation and upgrading
	Road transport (maintenance areas only)
	Road maintenance (maintenance areas only)
Least talked about	New social services
Talked about *negative* changes	Access to VDC services
	Road disruption
	RAP effect on local wages

1.2 Poverty

1.2.1 Defining poverty

Whilst defining poverty is not always straightforward, it is generally thought to be linked to a number of factors related to food security and remoteness in the Mid and Far West of Nepal. The RCA study finds that how people see themselves compared with others these days is deeply linked to the availability of cash in their household rather than to other manifestations of poverty. This is because having cash has increasingly become a necessity for paying for electricity, mobile phone credit, education costs and health costs. Because of the drought, poor recent harvests and predicted worse

ones to come, people shared particular concerns about raising sufficient cash through wage earnings or remittances to pay for food shortfalls on top of these other cash costs. These combined with increasing needs for cash has fuelled people's growing disinterest and worry about farming with its associated risks, stimulated interest in seeking skills and education that will result in waged work, and more or less eradicated traditional barter arrangements.

It is important to appreciate this significant trend towards a cash-based economy and the impacts this has on people's choices and consumption behaviour as we discuss the conventional measures of poverty below. For example, people may be making rather different choices about their assets than they would have done without these new trends and the impact of the drought. The poverty line and food poverty line are poverty thresholds defined for the Mid and Far West districts and derived from the NLSS-III. In short, the poverty line provides the minimum consumption level per person per year for essentials (i.e. clothing, housing, etc.) and the food poverty line is the minimum annual monetary value of approximately 2,100 calories food intake per person per day.

Nevertheless, the Proxy Means Test (PMT) and Progress out of Poverty Index (PPI) approaches provide two distinct methods of measuring multidimensional (that is, not solely income-related) poverty. Though by no means perfect, these approaches give rich insights into short and longer term aspects of poverty trends in the region.

1.2.2 Analysis of Poverty Change

Table 5 indicates the percentage of households classified below the poverty line, and the food poverty line, at each of the surveys (baseline and midline) in each of the domains. It is an analysis of poverty change using the PMT measurement of poverty, discussed in full in 1.2.3 below. The green coloured shading in the table indicates a reduction in the percentage of households below the poverty or food poverty lines and the red coloured shading in the table indicates an increase in the percentage of households below the poverty or food poverty line between baseline and midline for the respective domains in the build and maintenance districts.

Table 5: % households classified below the poverty line by domains in the build and maintenance districts

		% Below Poverty Line		% Below Food Poverty Line	
		Baseline	Midline	Baseline	Midline
Build	RBG	53.0%	50.8%	4.8%	7.7%
	Inner	62.5%	59.7%	7.2%	7.6%
	Outer	62.1%	57.5%	8.0%	5.1%
Maintenance	RMG	61.6%	67.3%	11.4%	12.0%
	Inner	66.0%	61.2%	14.9%	12.3%
	Outer	70.0%	71.1%	18.9%	23.2%

Table 6: % households that rose above, fell below or remained above or below the poverty line by domains in the build and maintenance districts

		% of Households			
		Remained Above Poverty Line	Rose Above Poverty Line	Fell Below Poverty Line	Remained Below Poverty Line
Build	RBG	36%	13%	11%	40%
	Inner	26%	14%	11%	48%
	Outer	28%	15%	10%	48%
Maintenance	RMG	20%	12%	18%	49%
	Inner	22%	17%	12%	49%
	Outer	16%	13%	14%	57%

Table 7: % households that rose above, fell below or remained above or below the food poverty line by domains in the Build and Maintenance districts

		% of Households			
		Remained Above Food Poverty Line	Rose Above Food Poverty Line	Fell Below Food Poverty Line	Remained Below Food Poverty Line
Build	RBG	90%	2%	5%	2%
	Inner	88%	4%	5%	3%
	Outer	90%	5%	2%	3%
Maintenance	RMG	82%	6%	7%	5%
	Inner	78%	10%	7%	5%
	Outer	67%	10%	14%	9%

Within the RBG domain (direct RAP beneficiaries) there was a slight drop in the percentage of households being classified as below the poverty line, but a slight increase in the percentage of households being classified as below the food poverty line. This may suggest an improving situation for those households in the middle of the poverty scale of this domain but a worsening situation for those who were at the lower end of the scale at baseline. The same trend is also seen to a smaller extent in the general population of the build inner domain (non-direct beneficiaries), where there was a slight increase of households under the food poverty line but a decrease in households below the overall poverty line.

The inner maintenance domain (non-direct beneficiaries) saw reductions in the proportion of households classified under both definitions of the poverty line. Within the RMG domain (direct beneficiaries), there was a much more notable increase in households being classified as below the overall poverty line than being classified below the food poverty line; this suggests the decreases in PMT (see 1.2.3) are affecting the middle of the population rather than the extreme lower end. The opposite was the case for the outer domain, where the percentage below the poverty line only increased slightly but where there was a much larger increase in the percentage below the food poverty line.

Table 8 illustrates the changes in the proportion of households in the inner and outer domains being classified as under the poverty line by each district to account for geographic trends in poverty within and between districts. Similar to Table 5, green shading indicates reduction in poverty, red indicates increase in poverty, no colour indicates no change.

Table 8: % households classified below the poverty line by each RAP district

		% Below Poverty Line			
		Inner		Outer	
		Baseline	Midline	Baseline	
Build	BAJURA	59%	66%	53%	66%
	HUMLA	67%	59%	61%	46%
	KALIKOT	64%	64%	68%	69%
	MUGU	56%	44%	59%	51%
Maintenance	ACHHAM	58%	61%	71%	72%
	DAILEKH	80%	69%	82%	80%
	DOTI	78%	65%	Midline	70%
	JUMLA	51%	50%	48%	46%

In the build areas Humla and Mugu both saw substantial reductions in the inner and outer areas in the proportion of households classified as under the poverty line. Bajura saw an increase in households being classified as under the poverty line, in both the inner and outer areas. Kalikot largely saw no changes in either inner or outer areas. From the RCA studies in Humla and observations in Mugu, many households engage in a lucrative herb trade. There was almost no net change in poverty rates in Achham or Jumla. In Doti and Dailekh there were significant decreases in the poverty rates within the inner domains. Within the outer domains only Doti saw a noticeable change in the % of households classified as below the poverty where there was a slight increase in this proportion.

A **poverty gap** analysis enables us to understand the depth and severity of poverty – how far beneath a given poverty line a group are. An analysis was completed to show the poverty gap statistics within each of the domains at the time of the baseline and midline surveys. However, there was very little change in any of the estimated poverty gap statistics, hence this table is not included.

1.2.3 The Proxy Means Test (PMT) approach

The Proxy Means Test (PMT) approach sought to model household consumption upon a range of explanatory variables to provide a multidimensional assessment of poverty, compared with the more straightforward and less useful income-only measure of poverty. In order to construct the PMT model, the Nepal Living Standards Survey 3 (NLSS-III) was used as the starting point, drawing upon analysis conducted by the World Bank/Nepal Central Bureau of Statistics (WB/CBS) in 2013 that sought to calculate small area estimates of poverty across Nepal based upon NLSS-III data.[11] Based upon these criteria, a range of possible indicators were identified and the selected variables are summarised below in Table 9.

[11] Government of Nepal National Planning Commission Secretariat/Central Bureau of Statistics/World Bank (2013). *Small Area Estimation of Poverty, 2011*. April 2013.

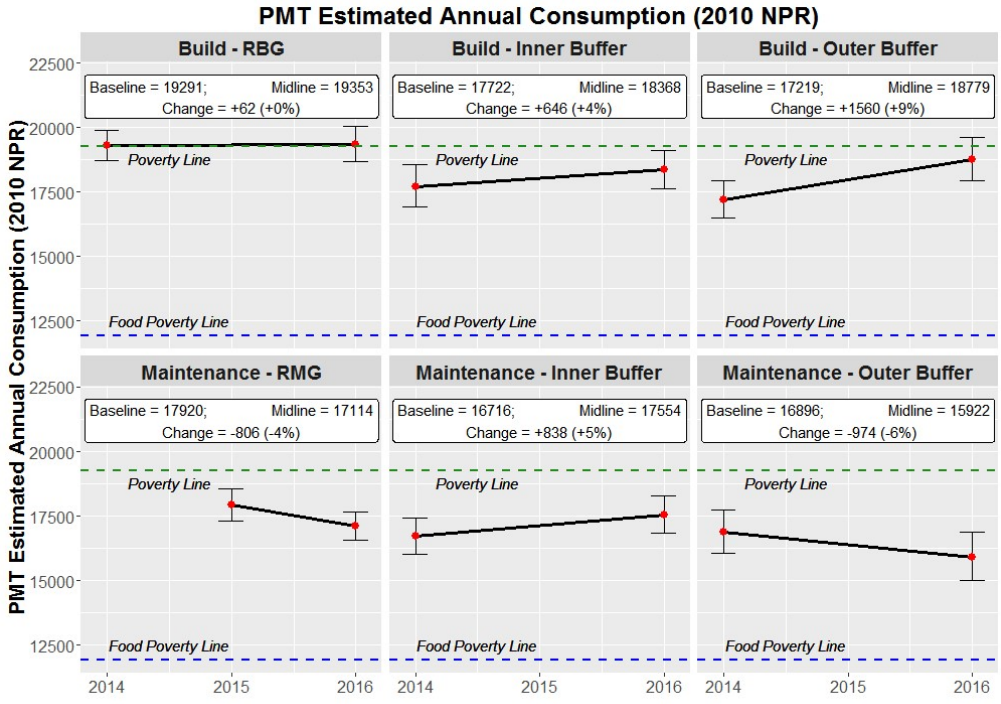
Table 9: PMT explanatory variables

Domains	Variable
Constant	
Demography	Caste of head = Dalit
	% of house aged <=6
	% of house aged 7–15
	Household size
Education and employment	Tutor used for children
	Income from employment or sales
	Income from remittances
Housing	Number of rooms in house
	Roof is galvanised iron or concrete
	Firewood or dung as cooking fuel
Physical assets	Number of assets owned
	Phone owned = Yes
	Land owned
Productive assets	Use of any improved crop varieties
Health	Food consumption score
	Perception of healthcare facilities
Education & Employment	Complete secondary education
Health	Unsafe birth deliveries
	Children under 24m vaccinated against measles

1.2.4 PMT consumption estimates and the poverty line

Figure 3 shows changes in the average household PMT consumption estimate per domain between the baseline and midline. For example, the Build RBG PMT estimated annual consumption shows the average household annual consumption for direct RAP beneficiaries of RBGs at baseline and midline. The estimated figures refer to annual household consumption as valued in 2010 Nepalese rupees (NPR).

Figure 3: PMT estimated annual consumption (2010 NPR)



The results show slight increases in the estimated value of annual household consumption in real terms within the build domains. The increase for the outer build domain was highly statistically significant ($p<0.001$) but the increase for the inner build domain was not statistically significant ($p=0.131$). At both surveys the average scores in the RBG domain was almost exactly equal to the poverty line of 19,261 NPR. There was no significant change within this domain between the baseline and midline surveys ($p=0.828$). It is worth noting, however, that the results for direct RAP beneficiaries in RBGs was significantly higher than the results in both the build inner and outer domains at baseline and were still higher than the other two domains at the midline.

In terms of poverty as measured by the PMT this suggests that the RBG households were better off than the inner and outer domain from the outset, but with rapid catch-up for the latter groups in the two-year period since the baseline. In the maintenance areas the inner domain households (non-direct beneficiaries) showed a slight increase in the PMT consumption whereas outer domains both decreased slightly. Both changes were of borderline statistical significance ($p=0.038$ for the inner domain increase; $p=0.057$ for the outer domain decrease). There was a significant decrease in the PMT estimate for the direct beneficiaries in RMGs ($p=0.005$). In all three domains the average PMT score at both baseline and midline were slightly below the poverty line of 19,261 rupees but the average estimates were still well above the food poverty line of 11,929 NPR.

Figure 4: Gender (head of household) disaggregated PMT estimated consumption per domain in build and maintenance area

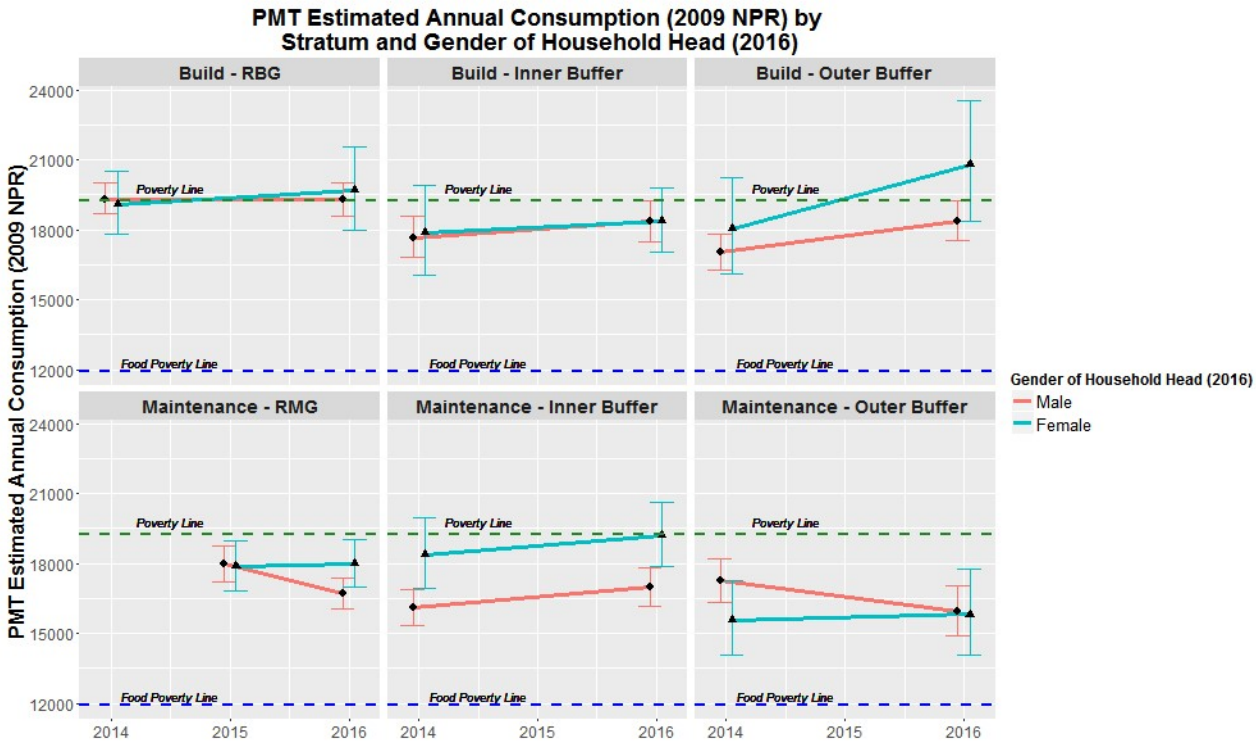


Figure 5: Caste (upper caste and Dalit) disaggregated PMR estimated consumption per domain in build and maintenance area

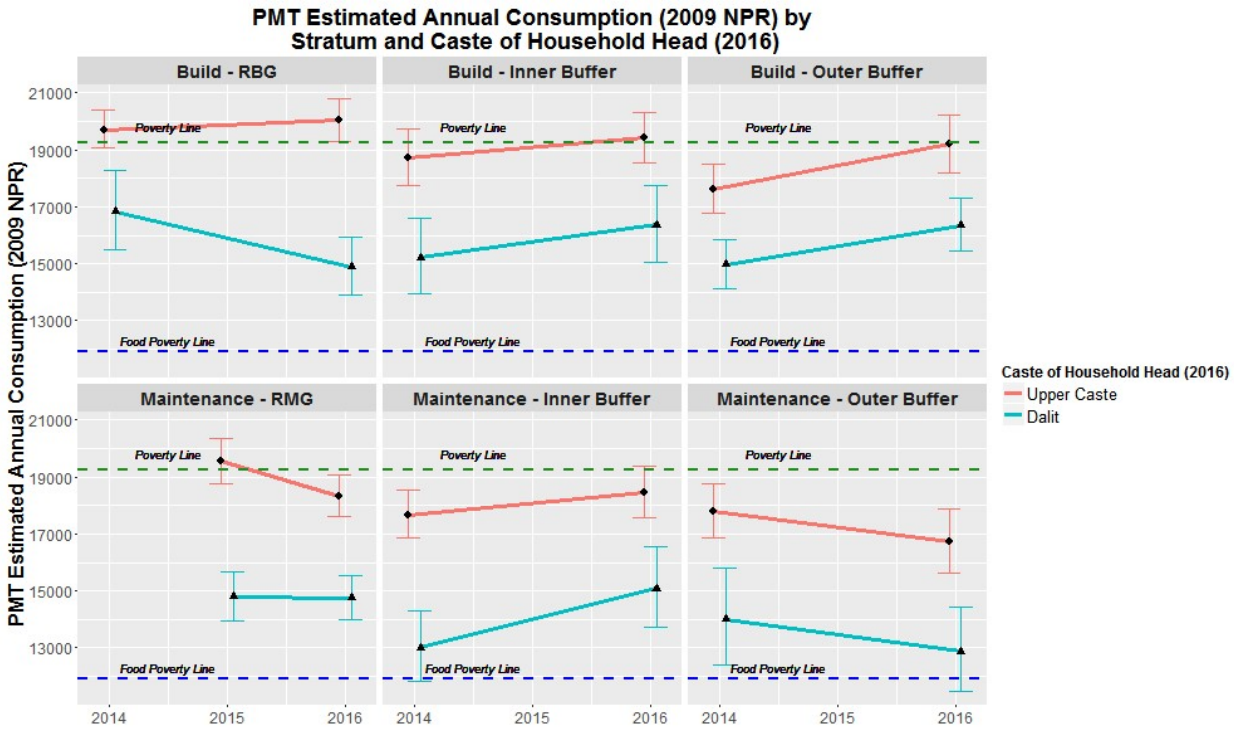
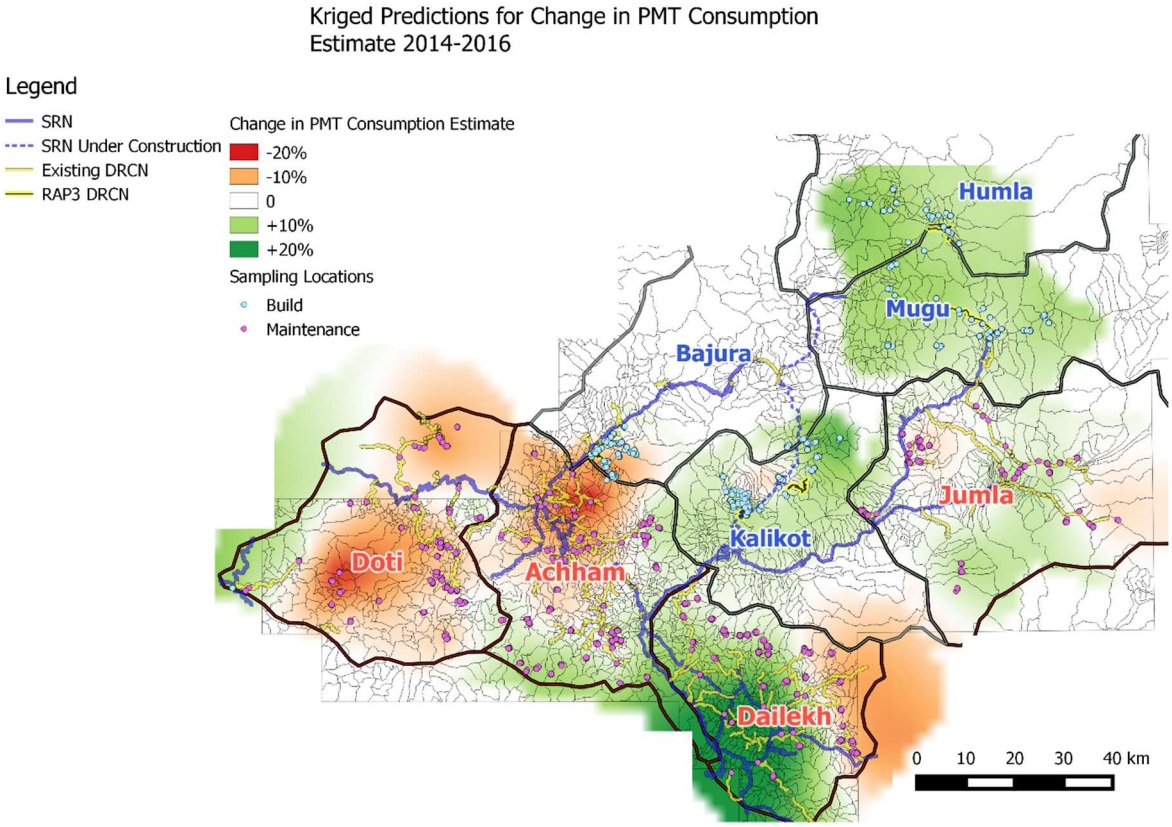


Figure 4 and Figure 5 provide the average estimated PMT consumption by gender of household and caste of household respectively. There are different trends when considering gender of households, with female-headed and male-headed households faring differently between domains and over time. When looking at caste of household (simply looking at upper caste and Dalits) the PMT score in all domains for Dalits is lower at baseline and midline compared with upper castes, with little to no convergence.

When considering the change in the annual estimated PMT, it is important to note the different contexts of these areas: maintenance areas are generally better connected than build areas and hence caution is required when comparing the build areas with the maintenance areas. **In all but the outer maintenance domain and RMG domain (direct RAP beneficiaries in RMGs), there is a convergence towards the poverty line.**

Figure 6: Kriged prediction (i.e. geo-spatial interpolation) for change in PMT consumption across the region over 2014–2016



However, the picture is a little different when looking at the changes in PMT on a geographical basis. Figure 6 shows clear geographic differences in how the PMT estimates for consumption have changed between the baseline and midline. The green shade indicates a positive change in PMT consumption estimates (i.e. less poor) and the red shade indicates a negative change in the PMT consumption score (i.e. more poor). The darker the shade of the respective colour, the more intense the change.

In the build areas in Humla and Mugu there were very consistent increases across the whole districts of around 10% in the PMT estimates. In Kalikot a small area in the central part of the district saw a slight decrease in the estimates on average denoted by a light shade of red, whereas an outer domain area to the north of the district saw a relatively large increase in the estimated PMT result (green). The areas in Bajura saw a small decrease in the average estimated consumption (red).

Within the maintenance areas the majority of Dailekh saw a substantial increase in the average PMT consumption score (dark green) with the outer areas to the north-west seeing a small decline on average. Both Doti and Achham saw areas with strong declines in the PMT score on average (red); particularly the northern parts of Achham, within the inner domain, and the central areas of Doti, within the outer domain. There was very little net change in Jumla, either positively or negatively (no colour change). Table 10 below provides a district-wise percentage change in the PMT consumption score between the inner and outer domains.

Table 10: % change in PMT score between baseline and midline

	Change in PMT Consumption Scores 2014–16	
	Inner Buffer	Outer Buffer
BAJURA	-13%	-4%
HUMLA	+7%	+10%
KALIKOT	+4%	+9%
MUGU	+11%	+8%
ACHHAM	-6%	+6%
DAILEKH	+12%	+3%
DOTI	+5%	-10%
JUMLA	+5%	+2%

1.2.5 Taking Inflation into account

The poverty lines determined as part of the NLSS were based according to the value of goods in 2010. Table 11 indicates the approximate estimates of these poverty lines inflated to 2014, 2015 and 2016 to correspond with the timing of these three surveys. Table 12 presents the estimated results in each domain according to the relevant level of inflation. Given that the definition of poverty is set at 2010 levels from the PMT, and that inflation may not have uniformly impacted all of the goods accounted for in the consumption aggregate, these figures should only be taken as a rough approximation and should not be taken as a reliable estimate of the current poverty line within Nepal or the current average cash values of the household consumption.

Even with the caveat on inflation approximations, it is clear that when comparing the two tables the mean **PMT consumption in all domains is above the food poverty line**, and with the exception of the RBG domain, all are below the poverty line at midline.

Table 11: Approximate inflation-adjusted estimates of PMT poverty thresholds across the region (in NPR)

Year	Inflation over 2010	Food Poverty Line (NPR)	Poverty Line (NPR)
2010 (NLSS)	NA	11,929	19,261
2014 (Baseline)	44%	17,148	27,687
2015 (RMG Baseline)	57%	18,691	30,179
2016 (Midline)	68%	19,999	32,292

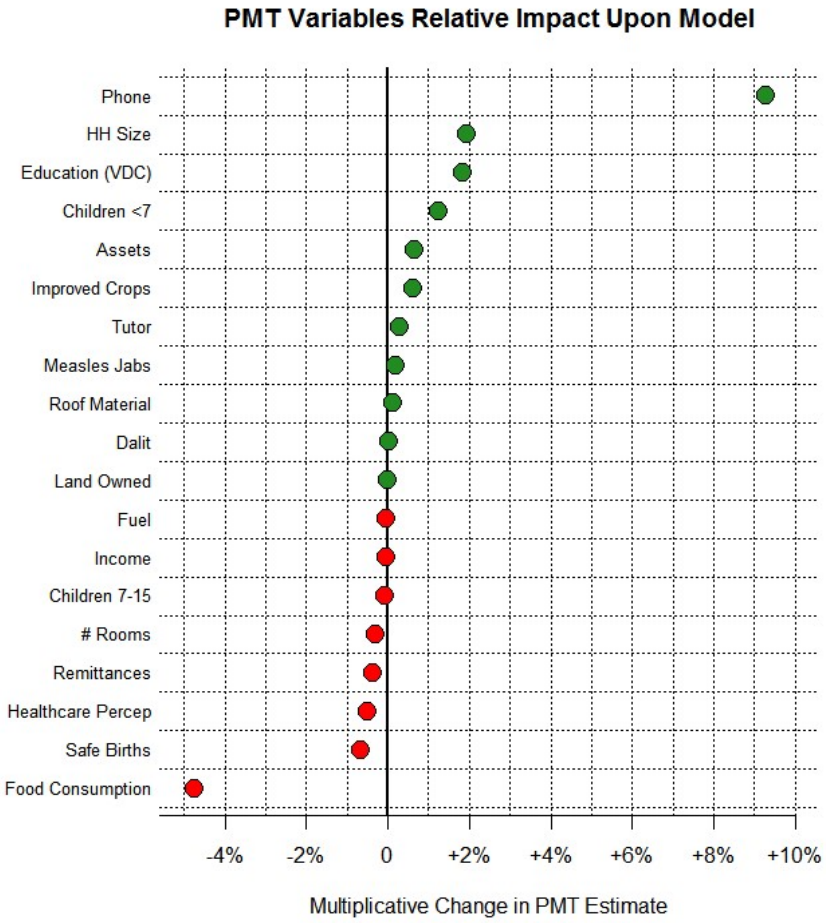
Table 12: Estimated average PMT consumption score (in NPR) inflation-adjusted across domains in build and maintenance area

		Mean PMT Consumption (in NPR) (Adjusted for Inflation)	
		Baseline (2014)	Midline (2016)
Build	RBG	27,687	32,446
	Inner	25,475	30,795
	Outer	24,752	31,484
Maintenance *(2015)	RMG	28,078*	28,692
	Inner	24,029	29,430
	Outer	24,288	26,694

1.2.6 Changes in PMT variables between baseline and midline

The changes in the PMT estimates between the baseline and midline were largely driven by changes in a small number of the variables that make up the PMT. The net effect of decreased food consumption score and increased mobile phone ownership resulted in the largest shifts in the PMT estimate. Figure 7 illustrates the impact that changes within each PMT variable had upon the predicted estimate of consumption. These effects show the overall shift in the PMT score as a result of each variable.

Figure 7: PMT variables



A change of '0' could be either the result of negligible changes in the variables or the result of the same number of households seeing increases as are seeing decreases. Four variables in particular are showing net positive gains in the PMT estimate (accounting for increases of greater than 1%) – increased mobile phone ownership, reductions in household size, increases in households with at least one member with complete education, and smaller percentages of the household being made up of young children. Mobile phone ownership is particularly dominant in the increases being produced. The only variable showing a negative effect on the PMT of more than 1% is the food consumption score.

What this means is that these are the poverty-related variables that have shown positive improvements over time. On the other hand, reductions in the food consumption score is a poverty-related variable that has got worse over time (see 1.3).

1.2.7 Progress out of Poverty Index (PPI)

The Progress out of Poverty Index (PPI) is a measurement used to assess the likelihood of a household being classified as below the poverty line. The 2010 Nepal customised version of this measurement was used in the household survey comprising 10 indicators, summarised in Table 13, with a maximum score of 100. The full definitions can be found in Annex 2.

Table 13: PPI indicators and weighted scores (out of 100)

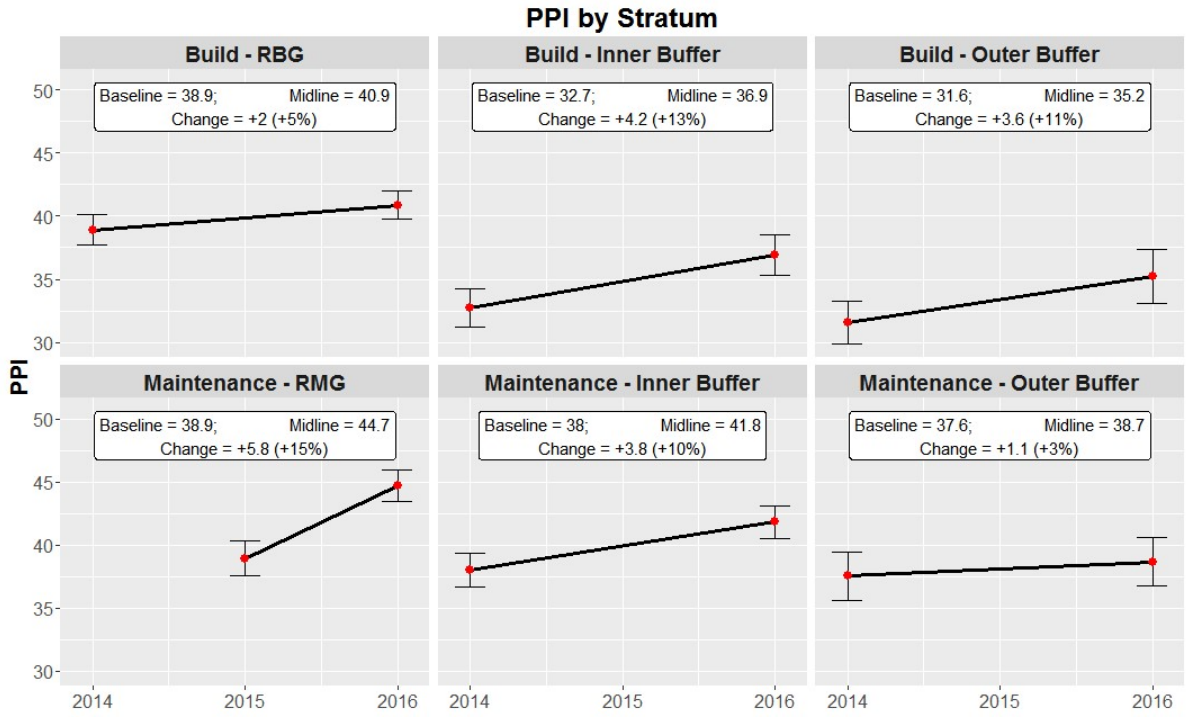
Indicator	Max Value
Household size	34
Employment of male head	8
Number of bedrooms	11
Wall material	6
Roof material	7
Separate kitchen	5
Type of stove	3
Type of toilet	6
Phone ownership	14
Land ownership	6

The higher the PPI score the less likely a household is to be below the poverty line, as indicated by the estimated probabilities of a household being below the poverty line and food poverty line in Table 14.

Table 14: Estimated probability of household being below the poverty or food poverty line based on PPI score

PPI Score	Estimated Probability of Household Being Below:	
	Food Poverty Line	Poverty Line
0	100%	100%
10	32%	78%
20	15%	59%
30	7%	39%
40	2%	18%
50	0%	5%
60	0%	2%
70	0%	0%

Figure 8: Average PPI score across domains in build and maintenance area



The PPI results increased between the baseline surveys and the midline survey in all domains, indicating a reduction in poverty levels *as estimated by the PPI*. A particularly large increase in the score, and thus a reduction in the estimated poverty level, was seen for the direct RAP beneficiaries in RMGs.

Figure 9: Overall changes in PPI indicators

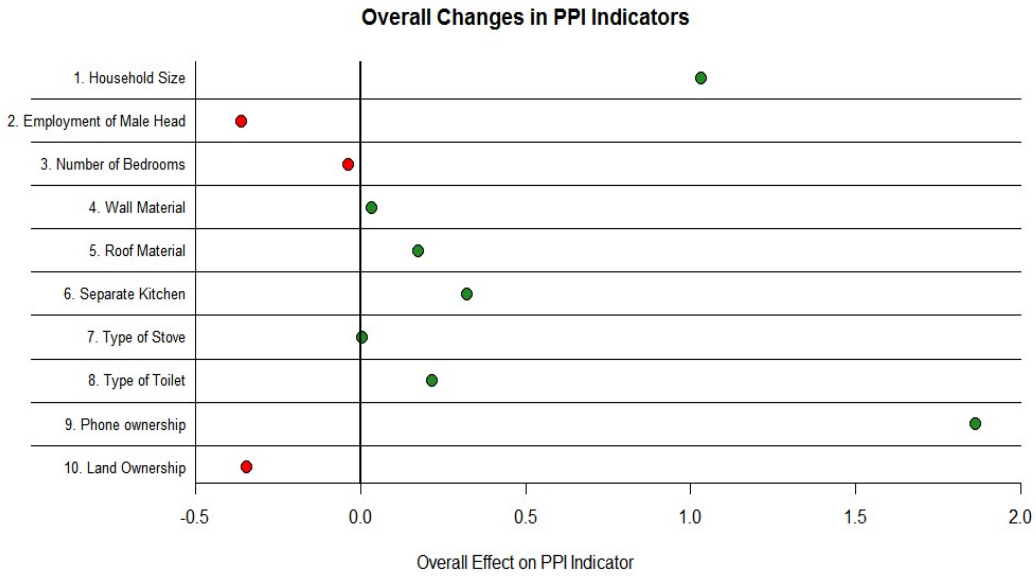


Figure 9 indicates the overall effects between the baseline and midline survey on the estimates of the PPI score. By far the largest contributing factor to the increases in this score was the increase in mobile phone ownership. This was added to by the decreasing size of households on average, which

is the indicator with the highest weighting assigned to it by a substantial margin, as indicated in Table 13, so relatively small changes within this variable can produce noticeable effects on the PPI score. Two of the indicators within the PPI had a substantial negative effect on the PPI between the baseline and midline: land ownership and the employment status of the male head of household.

1.2.8 Limitations of poverty measurement proxies

Although the two poverty measurements appear to be providing slightly contrasting results in regards to the direction of poverty there is still a reasonably strong level of correlation between the two methods. Considering the individual change for each household the two methods agree for the direction of change for around two-thirds of the total sample.

The different conclusions of the two models relate back to the selection of the variables included in the measurements, the weightings used, and the effects they have on poverty. Both methodologies are sensitive to changes in household size and mobile phone ownership. However, in the PPI model the household size is by far the highest weighted variable. Therefore, smaller changes in this indicator can result in large increases to the overall score.

The extent to which mobile phone ownership provides an indicator of poverty has also shifted dramatically since 2010 when the NLSS was most recently conducted and the PPI for Nepal was updated. Ownership of mobile phones has become widespread in a relatively short period of time, meaning that whereas in 2010 ownership of a mobile phone would help to separate out some of the wealthiest households, in 2016 this is no longer the case. The RCA conducted for RAP and elsewhere in the Mid and Far West of Nepal, indicates that mobile phone ownership has increased and that many families have several phones and some families living in poverty have got smartphones recently because of the importance of keeping in contact with family members living away from home. This rapid increase in phone ownership across all socio-economic groups, with the possible exception of some elderly households in recent years, probably makes this a less useful predictor of poverty within the PMT and PPI measurements.

1.2.9 Revisiting poverty

The importance of analysing poverty by using the PMT and PPI show that two different methods can illuminate poverty in different ways. The PMT is able to show change in poverty over the shorter term largely because of the significance of food consumption. The PPI is more concerned with longer term indications of poverty, such as the material used for housing. **The results from the midline, with the caveats mentioned, indicate that defining poverty both as short-term and longer-term phenomena generally shows a decline in poverty rates across the region.** Reduced household size and increased mobile phone ownership from these indicators are offset by the average reduction in the food consumption score (FCS). Unlike the variables in the PPI the FCS score is a shorter-term indicator of poverty, and as such may be related to temporary shocks, such as the impact of drought upon the region reducing the availability of food – see Section 1.3.5.

1.3 Vulnerability

Vulnerability is often conflated with poverty but they are not necessarily the same thing. Vulnerability refers to the effects of shocks. As Chambers (2006) mentions, vulnerability has two sides '*…an external side of risks, shocks, and stress to which an individual or household is subject; and an internal side which is defencelessness, meaning a lack of means to cope without damaging loss.'* Damaging loss could mean being economically impoverished, socially dependent, etc. **Given the largely negative impact that decreased food consumption has on the PMT, the food consumption score (FCS) can be seen as a proxy indicator to analyse regional trends from a vulnerability perspective.**

1.3.1 Effect of drought

As stated at the start of this section, the RCA study findings indicate that the most significant change affecting people in the RAP catchment area is the ongoing drought, a very specific covariate external shock (i.e. affects all in the Mid and Far West). Starting at the end of 2014, people say it has intensified and worsened. People in Doti, Achham and Bajura in April 2016 spoke about there being '*no proper rain since August 2015'*. Nearly all households surveyed in the build districts indicated that their household had been negatively impacted by the 2015/16 drought. However, the response to this question in the maintenance areas showed much lower levels of impact of the drought. There was a highly significant difference between the responses in the inner maintenance areas (65% impacted) and the outer maintenance areas (80%) impacted ($p<0.001$) (Table 15).

Table 15: % of households indicating negative impact of drought by domain in build and maintenance area

Domain	% Households Indicating Negative Impact of Drought
Build: RBG	94%
Build: Inner	95%
Build: Outer	93%
Maintenance: RMG	71%
Maintenance: Inner	65%
Maintenance: Outer	80%

Figure 10 shows geographically interpolated estimates of the response to this question across the study region. As expected, the four build districts show close to 100% of respondents indicating a negative impact from the drought. Within the four maintenance districts, Jumla consistently appears to show much lower levels of drought impact across the entire region. Less than half of respondents in Jumla indicated that they had been impacted by drought (Table 16).

Both Doti and Achham show small geographic areas where the impact of the drought was reported to be somewhat less; these areas contain parts of both the inner and outer domains so do not result in any difference between these domains. In Achham the geographic effect is particularly acute with one valley in the northern central part of the district accounting for nearly all of those within the district who indicated that they had been unaffected by drought. Overall just over 75% of respondents from Doti indicated a negative impact from drought, for Achham it was just over 85%. Dailekh was the only district to show a clear distinction between the inner and outer domains – in particularly the outer areas of the district in the north indicated a higher level of impact of the drought and the inner areas in the east of the district indicated lower levels of drought.

Figure 10: Kriged prediction (i.e. geo-spatial interpolation) of % of households across the region indicating negative impact of drought

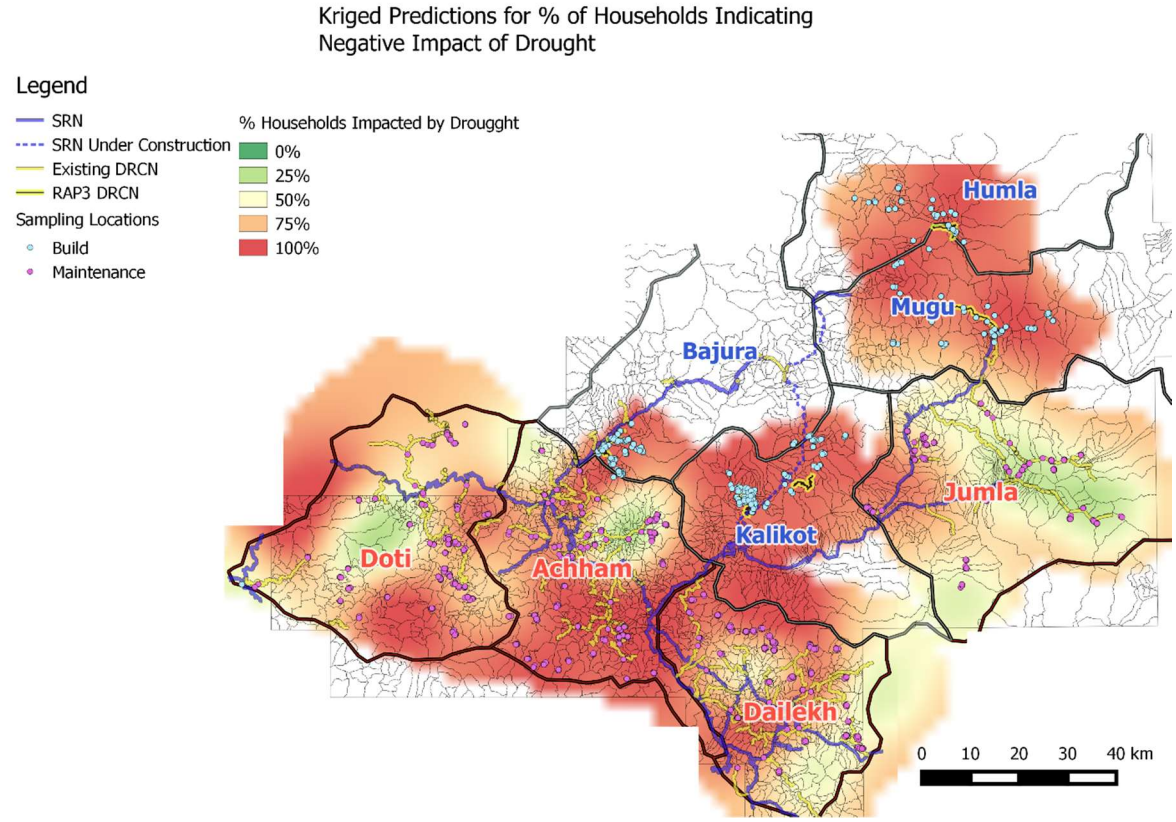


Table 16: % of households indicating negative impact of drought

District	% Households Indicating Negative Impact of Drought	
	Inner	Outer
Achham	84%	88%
Dailekh	65%	90%
Doti	77%	76%
Jumla	46%	41%

There was no significant correlation between caste and the effect of drought. However, there was a significant difference in the response by gender of the household head ($p<0.001$). Female-headed households were less likely than male-headed households to have recorded that they had suffered a negative impact of the drought. Overall 77% of female-headed households indicated that they had been impacted by the drought compared with 84% of male-headed households.

The RCA study findings would suggest that this may be because many de facto female-headed households have their spouses working abroad and have often reduced the land size and effort they put in as a family to cultivating their own crops. These households would probably be managing better because of the cash from remittances they have to buy food and feeling less concerned about the impact of drought. This effect also appears to have a geographic component where the gender of household has no bearing on whether the household was affected by the drought except for in Humla, Doti and Jumla where there are large differences (Table 17).

Table 17: % of male and female-headed households indicating negative impact of drought across RAP districts

District	% Households Indicating Negative Impact of Drought	
	Female-headed	Male-headed
Bajura	92%	94%
Humla	84%	94%
Kalikot	96%	94%
Mugu	90%	94%
Achham	81%	84%
Dailekh	76%	81%
Doti	64%	75%
Jumla	36%	46%

Respondents who indicated that they had been affected by the drought were asked to provide further details about some of the specific impacts the drought had made upon their household. Nearly all households who grew winter crops (wheat and barley) indicated that they had achieved lower yields from their crops than expected. Around 75% of those households who indicated they had been affected by the drought also grew winter crops. Researchers in the RCA study saw for themselves the extent of the effect of the drought noting withered wheat in fields and the families lived with complaining as they harvested it that the yield was down by about half compared with '*normal*' years. People were worried too that late rains would delay the maize planting with an anticipated worsened situation in 2017.

Over 90% of households indicated that food prices had increased as a result of the drought. Very few households in the survey indicated that they had needed to sell household assets or members of the household had been sent to live elsewhere as a direct result of the drought (Table 18). However, the RCA study indicated that people were grateful that they already have members of their families working in India and their cash incomes would help them through this period. Although it had been shared by people before in 2014, the drought has fuelled further disillusionment with farming and aspirations to move out of farming, especially for and among the younger generation and more talking about anticipated domestic or international migration for work.

Table 18: Impact of drought by domain in build and maintenance area

Domain	Impact of Drought			
	Sold Assets	Members of Household Migrated	Food Prices Increased	Winter Crop Production Decreased*
Build: RBG	3%	0%	92%	96%
Build: Inner	4%	1%	97%	98%
Build: Outer	6%	1%	97%	97%
Maintenance: RMG	2%	1%	93%	95%
Maintenance: Inner	2%	0%	90%	94%
Maintenance: Outer	4%	1%	95%	92%

**excludes households without winter crops*

1.3.2 Changing food consumption

The food consumption score (FCS), measured by assessing the frequency with which various food groups were eaten across a 7-day recall period, showed highly significant reductions on average in all domains, with the exception of the inner maintenance domain (non-direct RAP beneficiaries) where there was no significant change in the outcome. Generally, a score of 35 or above is considered to be 'acceptable', in terms of obtaining a sufficient quantity and diversity of food intake.

Despite the significant reduction in the FCS for direct RAP beneficiaries in RBGs, there was still strong evidence of a RAP effect when comparing this domain to the non-direct beneficiaries in the inner domain. At the baseline there was no significant difference between the food consumption score within these two domains (p=0.180) but at the midline the average FCS score for the direct RAP beneficiaries in RBGs was significantly higher than the non-direct beneficiaries in the inner domain (p=0.001) with the 'difference-in-difference' effect being very highly statistically significant (p<0.001). **This suggests that although the food consumption of RBG households was affected by the impact of the drought, they were able to maintain a more diverse diet than the other households in the inner build area and hence less vulnerable to the impact of the drought** (Figure 11).

Figure 11: Food consumption score per domain in build and maintenance area

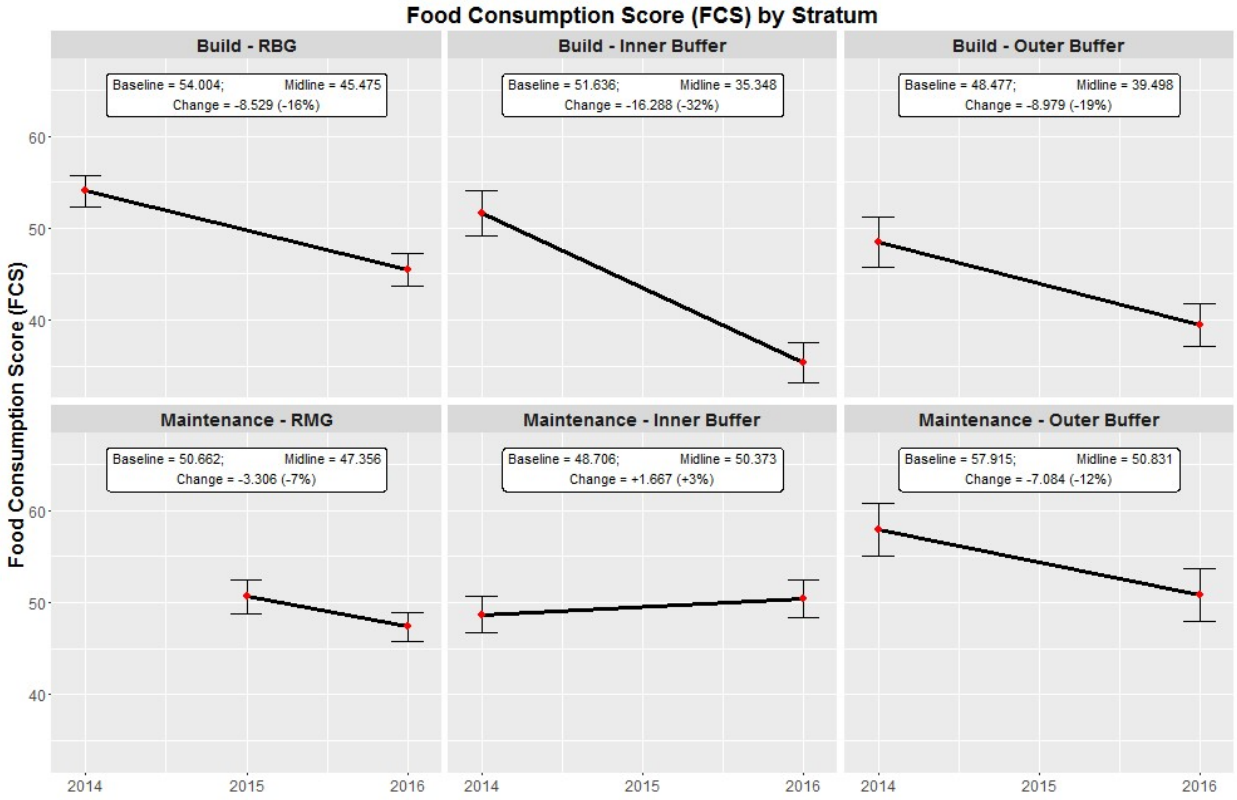


Figure 12: Gender disaggregated (by head of household) food consumption score by domain in build and maintenance area

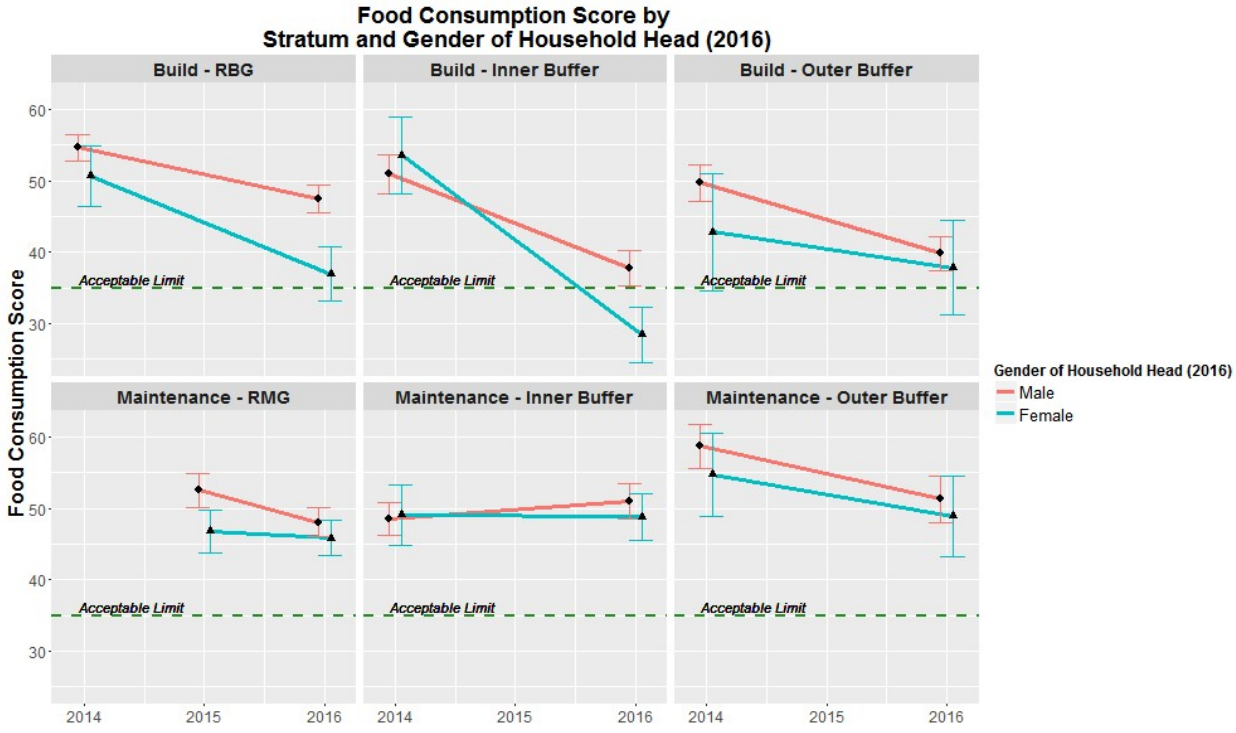
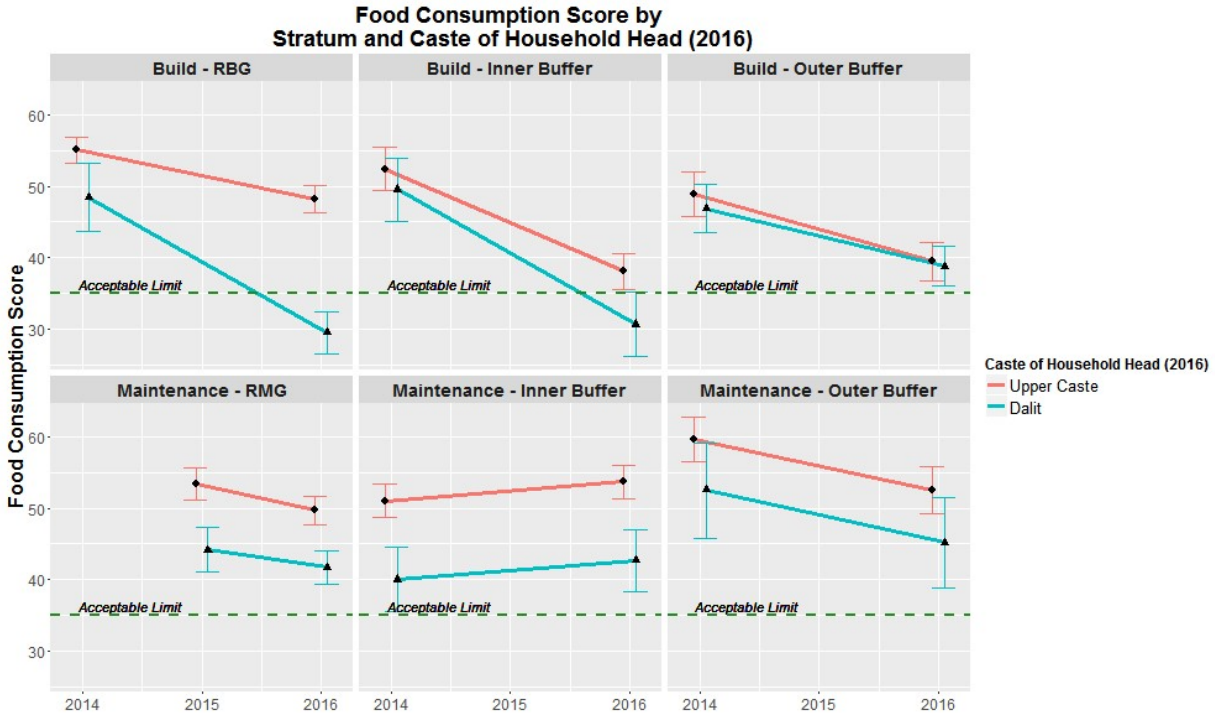


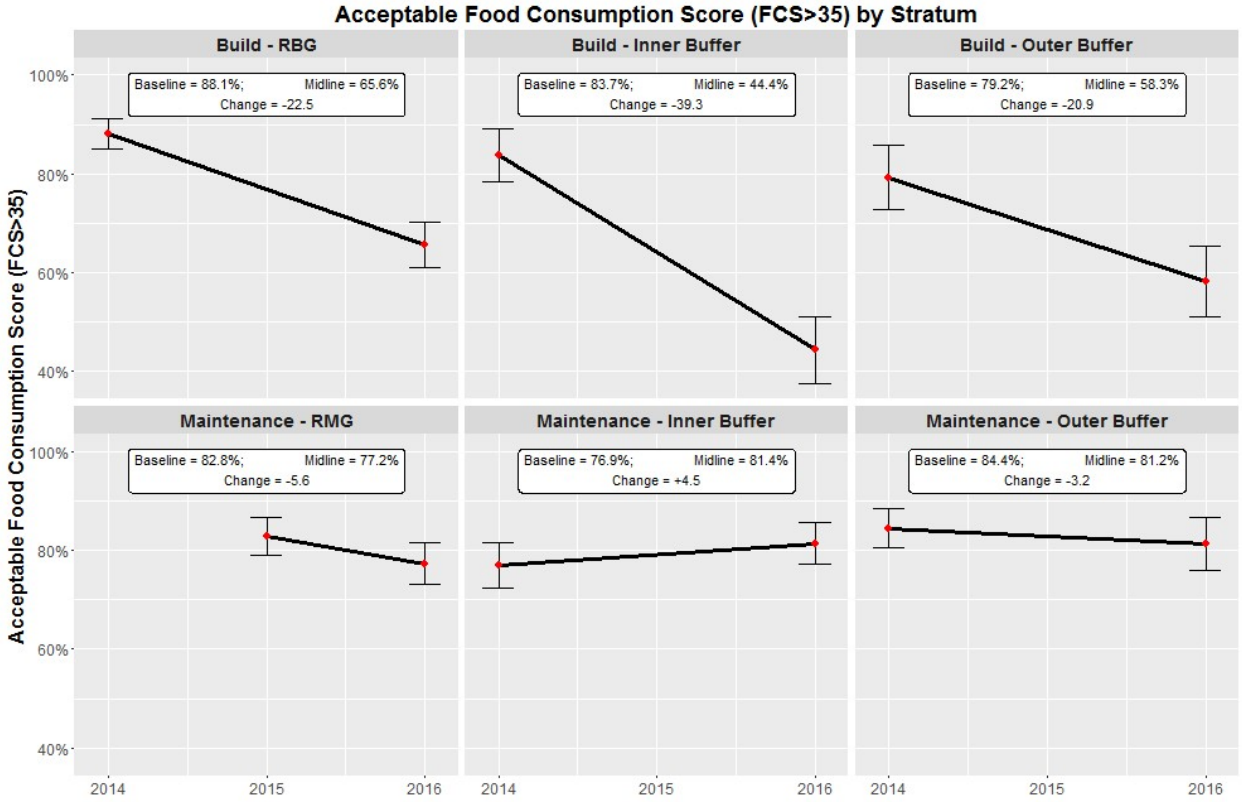
Figure 13: Caste disaggregated (upper caste and Dalits) food consumption score by domain in build and maintenance area



The percentage of households categorised as having below acceptable food consumptions reduced dramatically in all three build domains. In the inner build domain only 44% obtained an 'acceptable' FCS at the midline compared with 84% at the baseline. Although the FCS score reduced in the RMG

and outer maintenance domain, this drop did not lead to a statistically significant reduction in the % being categorised as having an FCS below acceptable levels (Figure 14). There is significant caste and gender differences: female-headed household's food consumption lower in all domains at midline than male-headed households; Dalits also have a lower food consumption score than upper castes in all domains both at baseline and midline.

Figure 14: Acceptable food consumption score by domain in build and maintenance area



This reduction is perhaps to be expected when taken along with the results seen in Figure 15 where large numbers of households indicated that they had reduced the variety of their diet as a result of the drought

When broken into the dietary subgroups it can be seen that there was no reduction in the frequency of staple foodstuffs (e.g. wheat flour, maize, rice). Nearly all households in the survey reported eating these foodstuffs within this group every day over the previous 7 days. The reductions in the score are being driven by reductions seen in the frequency in which lentils/pulses, dairy and vegetables were eaten. Reduction in lentil consumption is most notable, as this is given a high weighting compared with other food groups and this food group was reported to have been consumed very frequently at the baseline survey, 5–6 days a week on average in all domains (Figure 15).

The RCA study involved living with people over four nights and eating the same food as the families. At 2014, families mostly ate three meals per day with nearly all consuming rice at least once per day, usually at lunch, and roti made from wheat flour at other meals. In Humla the study families and neighbours ate rice at every meal. Only two families ate maize. As indicated by the survey, RCA found that less lentils are consumed than before with less than half of the families eating lentils every day as most had done in 2014. Most families ate leafy vegetables at least once per day but some families shared that they ate less than in 2014 directly because of the drought. Tomatoes which had been home-grown and conspicuous in achar (pickles) in 2014 were hardly ever eaten this time. People also explained that pests on vegetables had increased because of the drought and that vegetables yields

had been low not just because of drought but also because of occasional hail storms which had destroyed the already weakened plants. Milk (in tea or plain) or curd consumption was much the same as in 2014. Figure 15 indicates low consumption of fruit. None of the RCA study families ate fruit during the entire stay.

Although it remained at an average of 1 day per week or less throughout all domains, the frequency at which meat was consumed did increase in all 6 domains. The RCA findings confirm that meat is rarely consumed and when it is consumed people say and researchers observed that this was to celebrate New Year, mini Dashain or other special events, including welcome or farewells for migrant workers who typically visit home at this period. Chicken was more likely to be consumed than goat but most of the RCA families did not consume meat at all during the time the researchers lived with them. Only two families consumed eggs and this was considered exceptional.

Figure 15: Consumption of different food types by domain in build and maintenance area

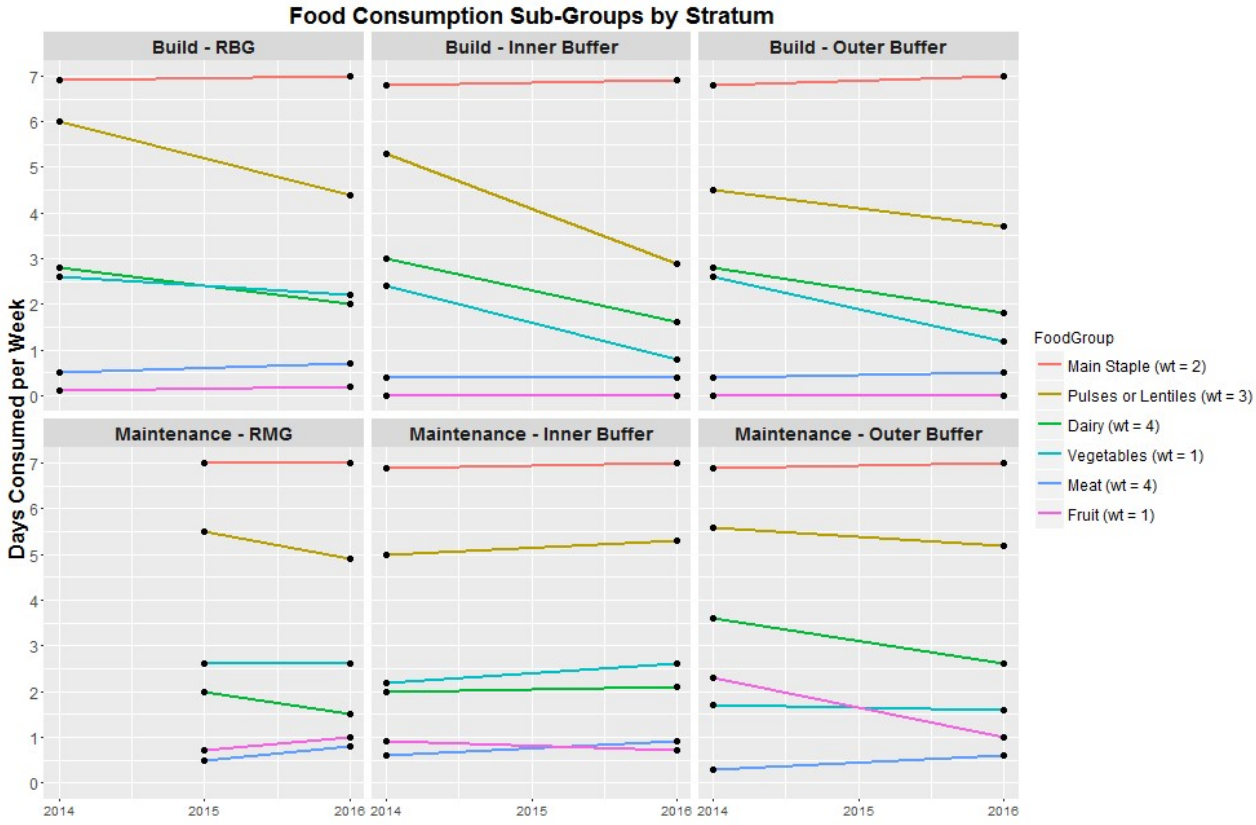


Figure 16: Kriged prediction (geo-spatial interpolation) of food consumption score across the region at Midline (2016)

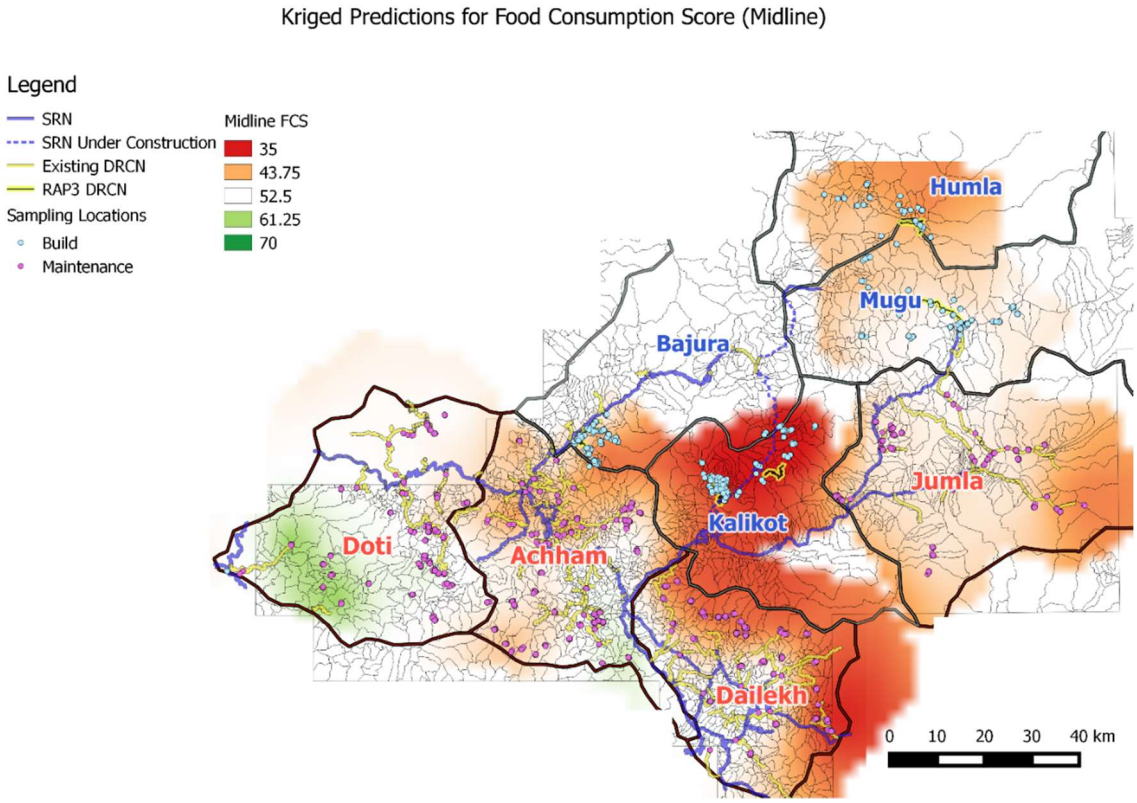


Figure 17: Kriged prediction (geo-spatial interpolation) of food consumption score across the region at Baseline (2014)

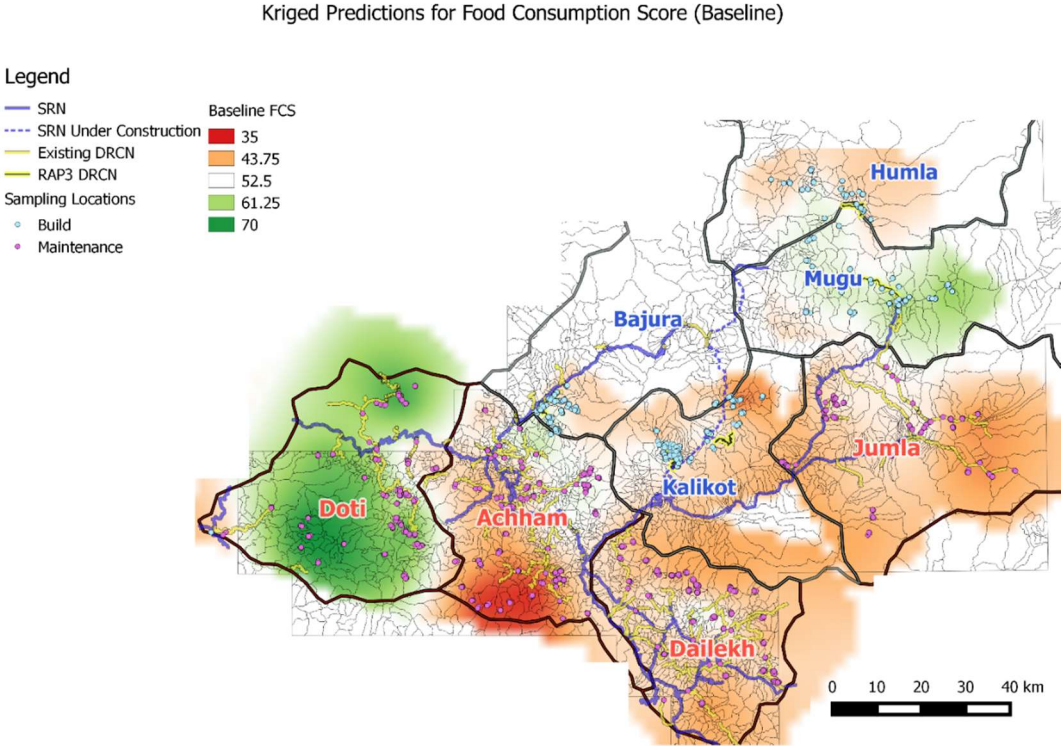
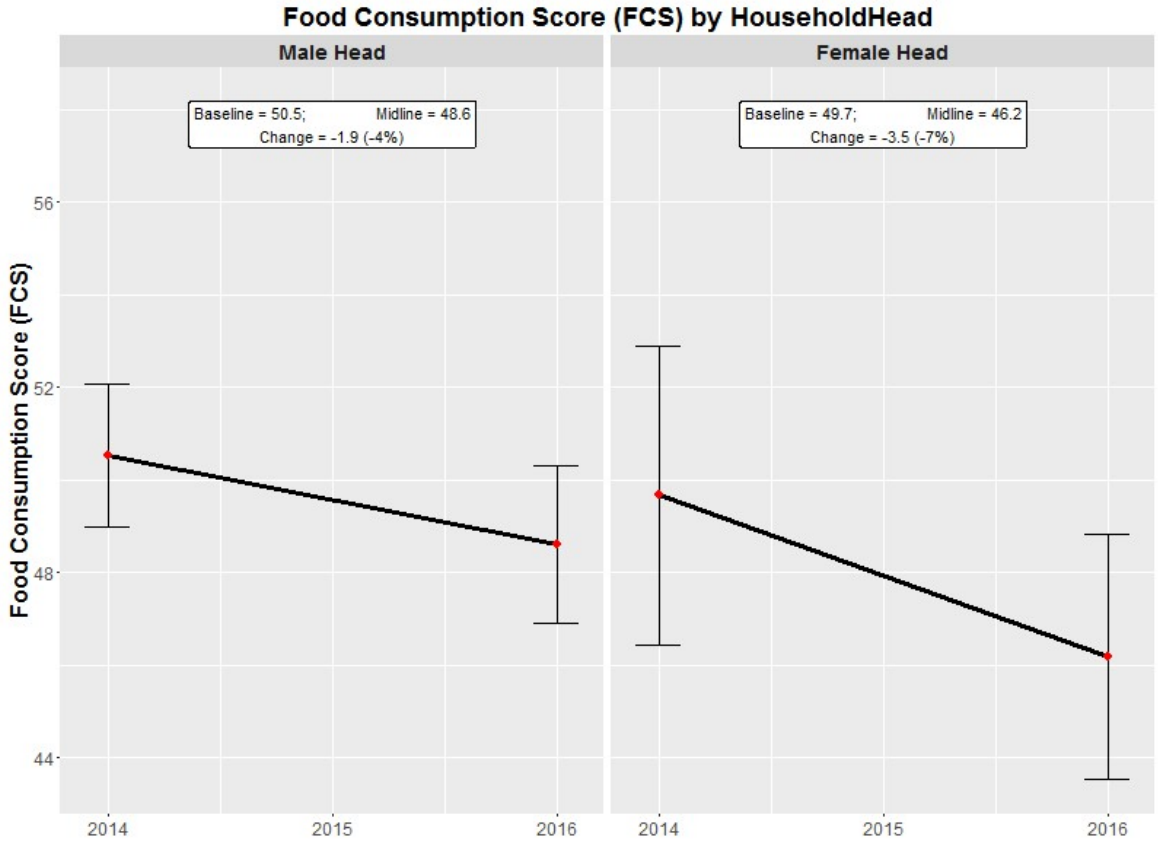


Figure 16 and Figure 17 show the geographic effects of the food consumption score at midline and baseline. Generally the relative patterns in the distribution are the same and there is a consistent shift downwards in the score across most regions. The exception to this is in the southern region of Achham, which had the lowest FCS on average of anywhere at the baseline survey, where the FCS increased between baseline and midline.

The food consumption scores at midline and differences over time showed significant differences between male and female-headed households and highly significant effects related to caste. At the baseline survey there was no significant difference overall between male-headed and female-headed households in the food consumption score. However, although the FCS reduced for both male-headed and female-headed households the average reduction in the score was almost twice as large for female-headed households as it was for male-headed households (3.5 points for females, 1.9 points for males). Overall when considering the reduction in FCS this was not statistically significant at the 5% level for male-headed households (p=0.088) but the reduction for female-headed households overall was (p=0.033) (Figure 18). The findings from the RCA study would suggest that this could have two interpretations: that female-headed houses are more dependent on remittance and so cannot purchase vegetables regularly and that they eschewed the extra burden of growing vegetables especially during drought.

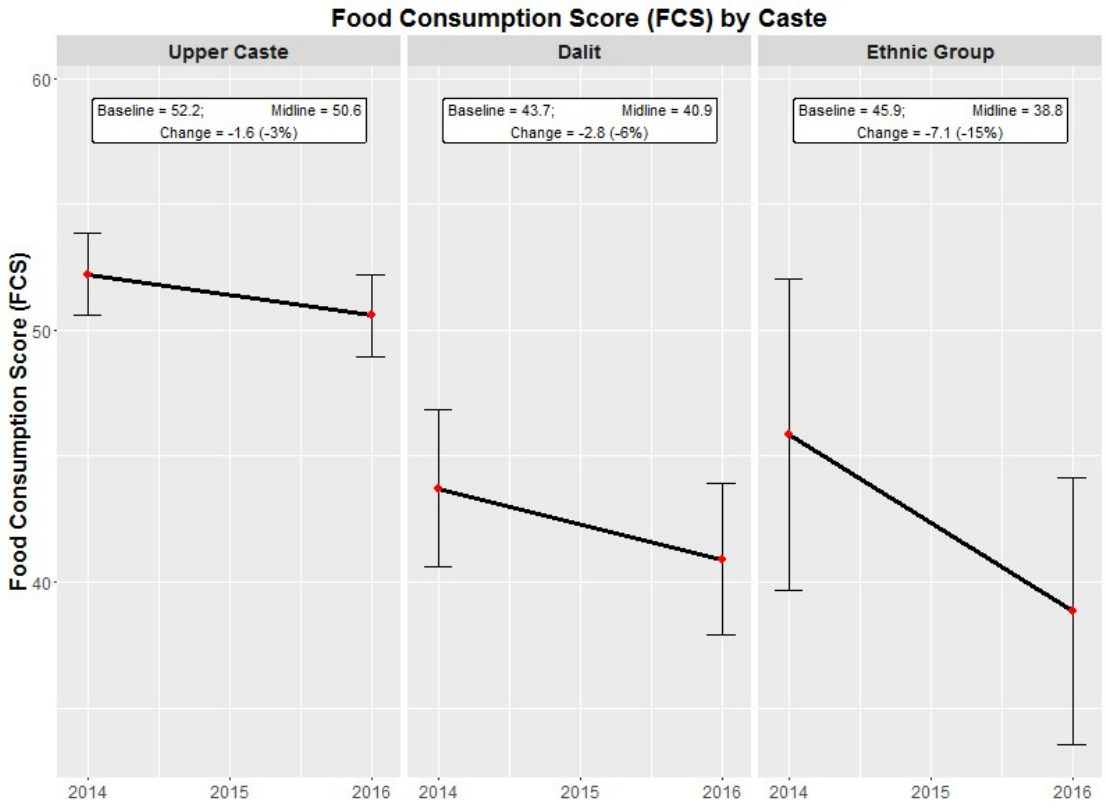
Figure 18: Gender-based (head of household) difference in average food consumption score across the region



Upper caste households had significantly higher food consumption scores than Dalit and ethnic group households at the baseline. In addition to this there was no significant reduction in the FCS for upper caste households between the baseline and midline surveys (p=0.141). There was also no significant reduction in the FCS for Dalit households (p=0.166), although the FCS remained highly significantly

lower than the upper caste households. There was a statistically significant reduction for the FCS of the ethnic group households (p=0.040) where there was a 7-point reduction in the FCS between baseline and midline (Figure 19). Dalit households in RCA communities typically explained to RCA researchers that they have little land for vegetable cultivation. They mostly sold on vegetable seeds that were distributed to them free.

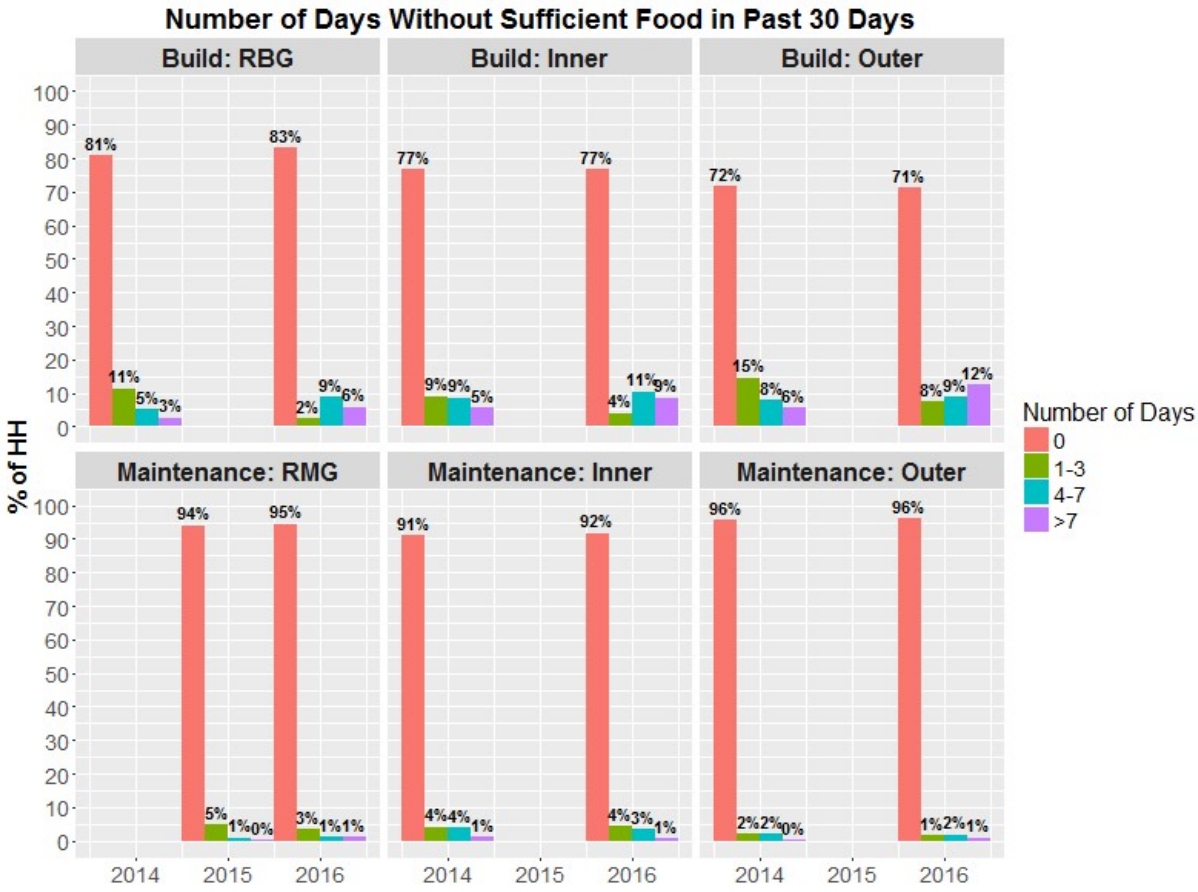
Figure 19: Caste based difference in average food consumption score across the region



In all domains the percentage of households indicating that there had been at least one day in the past 30 days when they did not have sufficient food to feed their entire household was virtually unchanged from the baseline surveys. This is despite the consistent decrease seen in the food consumption scores (Figure 20). The RCA found that although people had made adaptations to their food consumption because of the drought it had not resulted in them going without food or significantly reducing quantities of food eaten. The difference as indicated below was more in the diversity of foodstuff eaten.

The RCA provides insight into the changed food patterns through the food diaries maintained by the researchers during their time living with the study families. Overall families continued to take three meals per day as they had in 2014 but the diversity had changed and, in particular, they ate a more restricted range of vegetables. In Humla where the families have conspicuous cash, in particular from the sale of herbs and other forest products, families continued to take rice at least twice per day but in the other three study areas (Achham, Doti and Bajura) they only took rice in one of the three meals per day; a change for some since 2014.

Figure 20: Number of days without sufficient food in past 30 days by domain in build and maintenance area

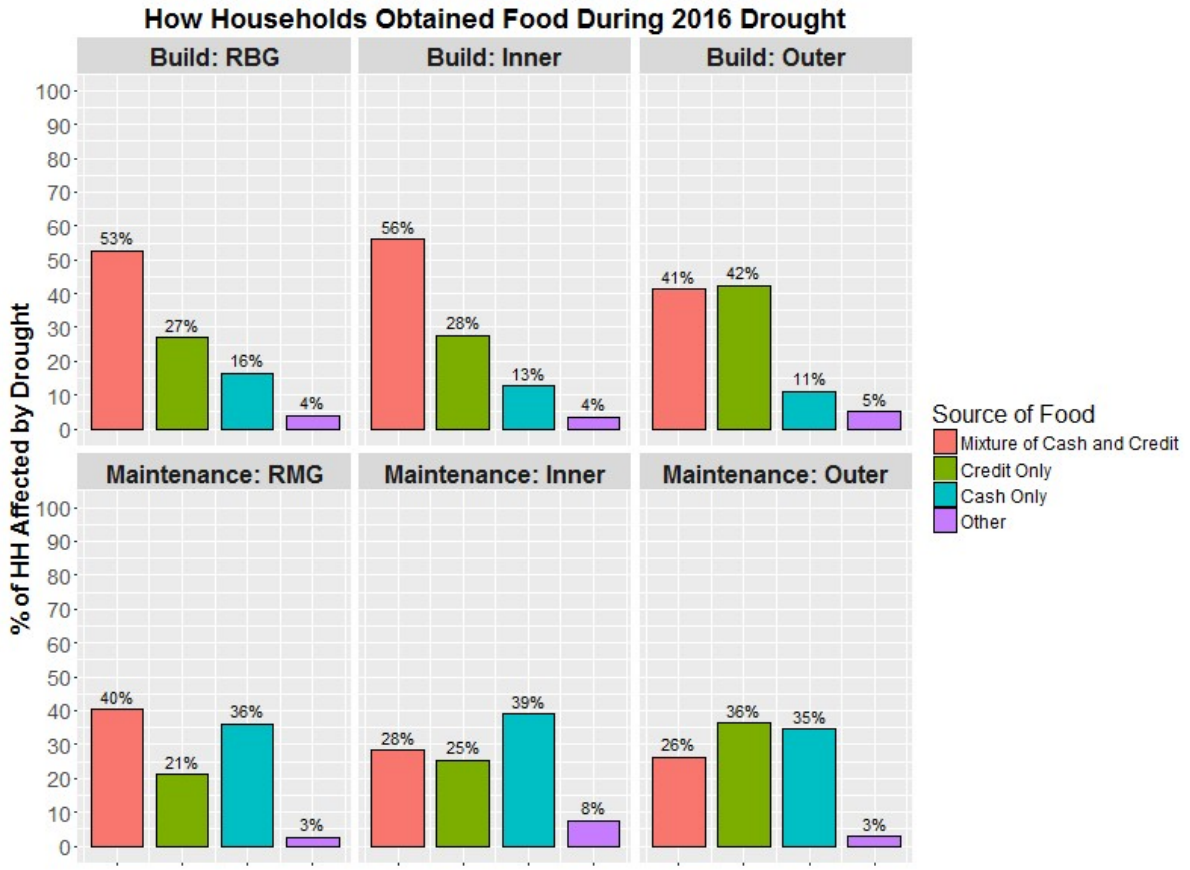


1.3.3 Coping strategy – changing food habits

From a vulnerability perspective it is important to understand how people have 'coped' with the drought given the fact that the vast majority of households have indicated that the drought has had a negative impact on them. When asked about how their household had coped with the lack of food over 85% of respondents who had insufficient food for at least 1 day indicated that they had borrowed food or money, again almost identical to the baseline survey. However, there was a substantial increase in households obtaining food on credit, from 68% of households at the baseline to 86% at the midline. Small increases were also seen for households purchasing less expensive foodstuffs and for households reducing portion sizes as a response to the lack of food.

Overall, households also employed a greater variety of coping strategies at the midline survey than the baseline survey when they were faced with insufficient food. Of the 13 available options provided in the survey, households selected an average of 3.4 strategies at the baseline which increased to 4.6 at the midline. The increased number of strategies may indicate a higher level of severity of the problems household were facing. This is also corroborated with increases in the number of households indicating that they had insufficient food for 7 or more days out of the last 30. At the baseline survey in 2014 just 67 households indicated they had insufficient food for 7 or more days within the last 30; this contrasted with 125 households from within the same domains in 2016. Figure 21 shows how households obtained food during the drought in 2016.

Figure 21: How households in each domain obtained food during the drought in build and maintenance area



Given increases in food prices and decreases in yields, households were asked how they obtained food. In the build areas only a small percentage of respondents indicated that they solely relied on cash. Over 80% indicated that they purchased food either solely or partially on credit. There were almost no differences between the direct RAP beneficiaries in RBGs and non-direct beneficiaries in the inner build domain in terms of credit purchases. The use of credit was particularly high in the outer build areas where over 40% of respondents indicated that they solely obtained food on credit. The findings also indicate that RBGs and RMGs are more likely to have obtained food through a mix of cash and credit compared with other domains.

The RCA study found that those getting regular wages from RAP in build areas were appreciative that they could use this to purchase rice, and shopkeepers were more inclined to give credit to people who they know work on the roads. Those in outer build areas who are less likely to have employment of the road are more likely to be dependent on remittances and negotiate credit while waiting for remittances to come through.

Cash purchases were more common in the maintenance areas with over 35% of food being purchased solely using cash, although the majority of households still made some credit purchases. Very few respondents indicated obtaining food from other sources (e.g. food for work programme; government depots; complete self-sufficiency).

Figure 22: Kriged prediction (geo-spatial interpolation) for % of drought affected households purchasing food on credit across the region

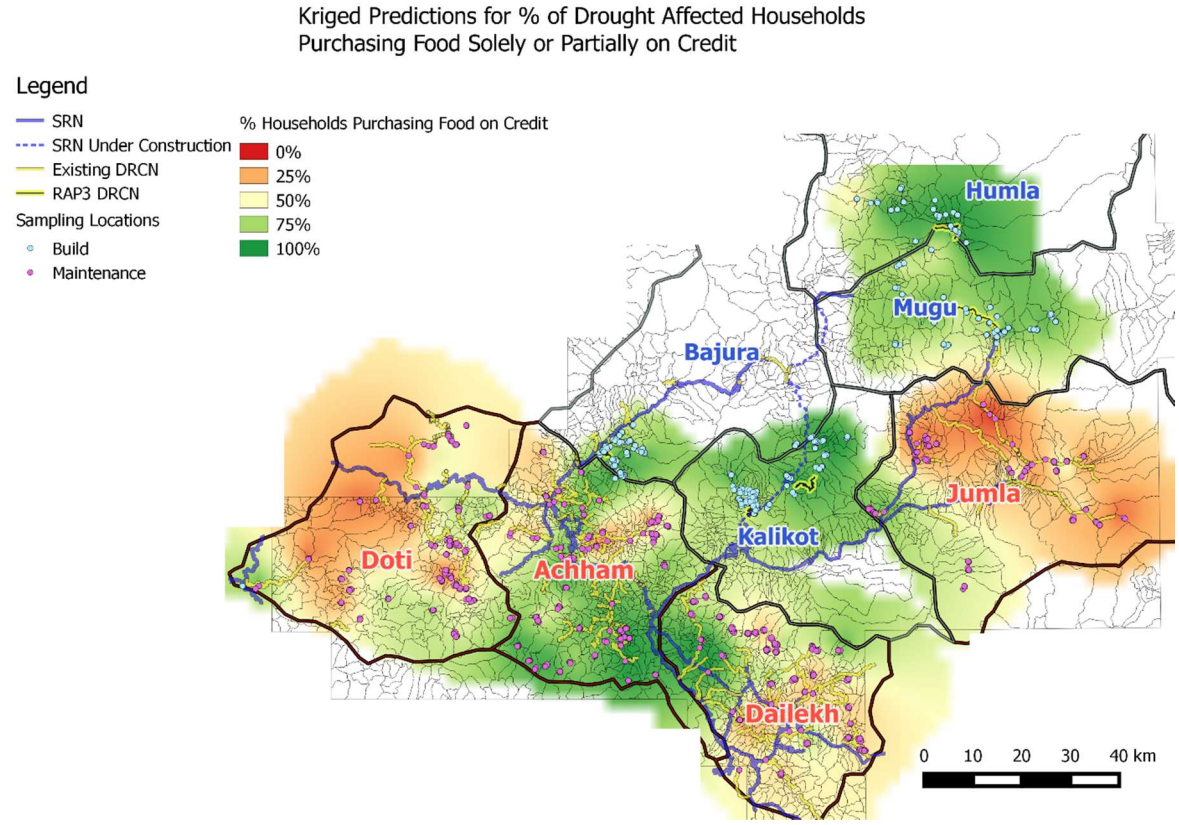


Table 19: % of drought-affected households making any food purchases on credit

District	% Drought-affected HH making any food purchases on credit
Bajura	81%
Humla	92%
Kalikot	84%
Mugu	75%
Achham	77%
Dailekh	53%
Doti	49%
Jumla	44%

There was no significant effect of gender of household head upon the use of credit purchases. There was a highly significant effect of caste – Dalit households were significantly more likely than other households to make purchases on credit ($p<0.001$). Overall, 82% of drought-affected Dalit households indicated that they had solely or partially made purchases on credit, compared with 71% of Upper Caste Households and 67% of Ethnic Group households. The effect of caste upon credit purchases was particularly acute within Doti and Dailekh. Within most of the districts the caste effect was relatively small, but within Doti 83% of Dalit households recorded purchasing food on credit compared with just 38% of Upper Caste. The difference in Dailekh was smaller but still substantial – 69% of Dalits recorded purchasing food on credit compared with just 48% of Upper Caste. The RCA study found that Dalit

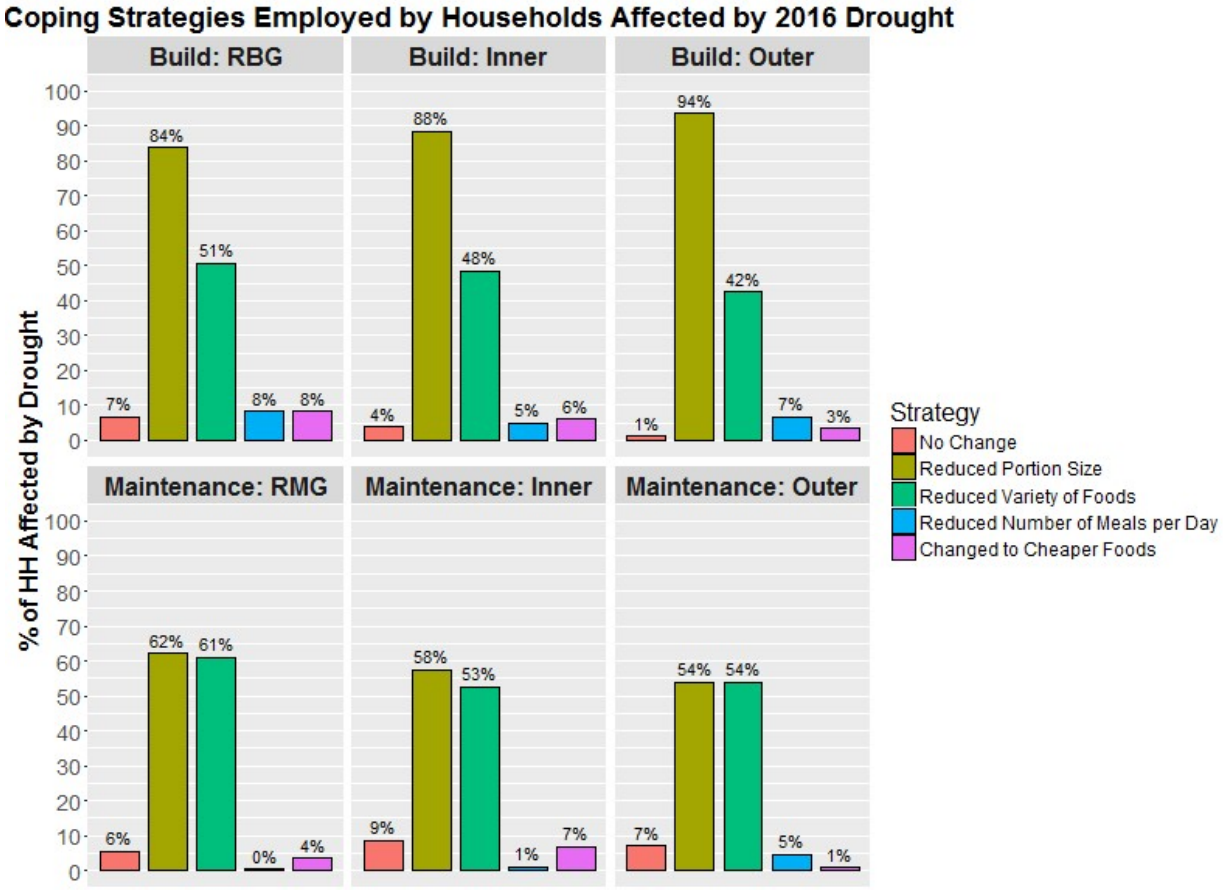
households in the RCA villages nearly all depend on remittances from members of the family working in India. As mentioned before families dependent on remittances may be more likely to take credit for food purchases as they wait for remittances.

Table 20: % of households indicating food purchases on credit

District	% Households Indicating Food Purchases on Credit		
	Dalit	Upper Caste	Ethnic Group
Bajura	86%	79%	*
Humla	95%	91%	88%
Kalikot	84%	84%	*
Mugu	80%	73%	*
Achham	84%	75%	*
Dailekh	69%	48%	55%
Doti	83%	38%	*
Jumla	38%	44%	*

**Ethnic group excluded due to small numbers of respondents in these areas*

Figure 23: Food coping strategies employed by households affected by drought by domain in build and maintenance area



Over 80% of those in the build area who had been affected by the drought indicated that they had reduced portion sizes as a result of lower crop yields and higher prices. Around 50% also indicated that they had reduced the variety in their diet. Respondents in the maintenance areas were slightly more likely to have reduced the variety in their diets but slightly less likely to have reduced portion sizes (Figure 23). The RCA study found that families had reduced the diversity of their diets, especially

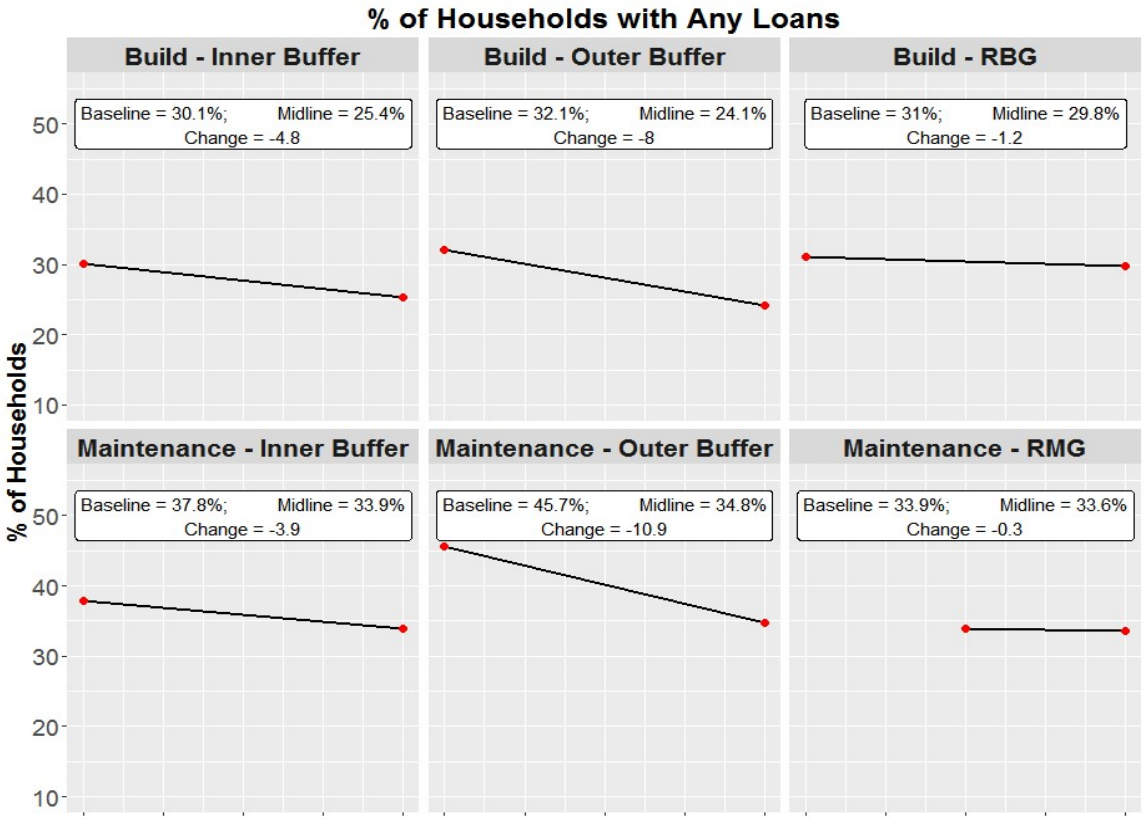
the range of vegetables consumed but people did not share nor did researchers observe that portion sizes had reduced. Furthermore, there was conspicuously more snack eating between meals, especially of instant noodles. As RCA teams have found elsewhere, when staples are short people may take more snacks and '*feel full*'. In build areas, people told RCA researchers that the heavy road work led them to eat more and spend more money on food, with workers in Humla commonly taking four meals per day and RBG groups in Bajura taking an extra meal of noodles together every day after finishing work.

Respondents in the build domains were also more likely to indicate that they used multiple coping strategies – 45% of respondents in the build areas selected two or more of the coping strategies, compared with 20% in the maintenance areas.

1.3.4 Coping strategy – loans

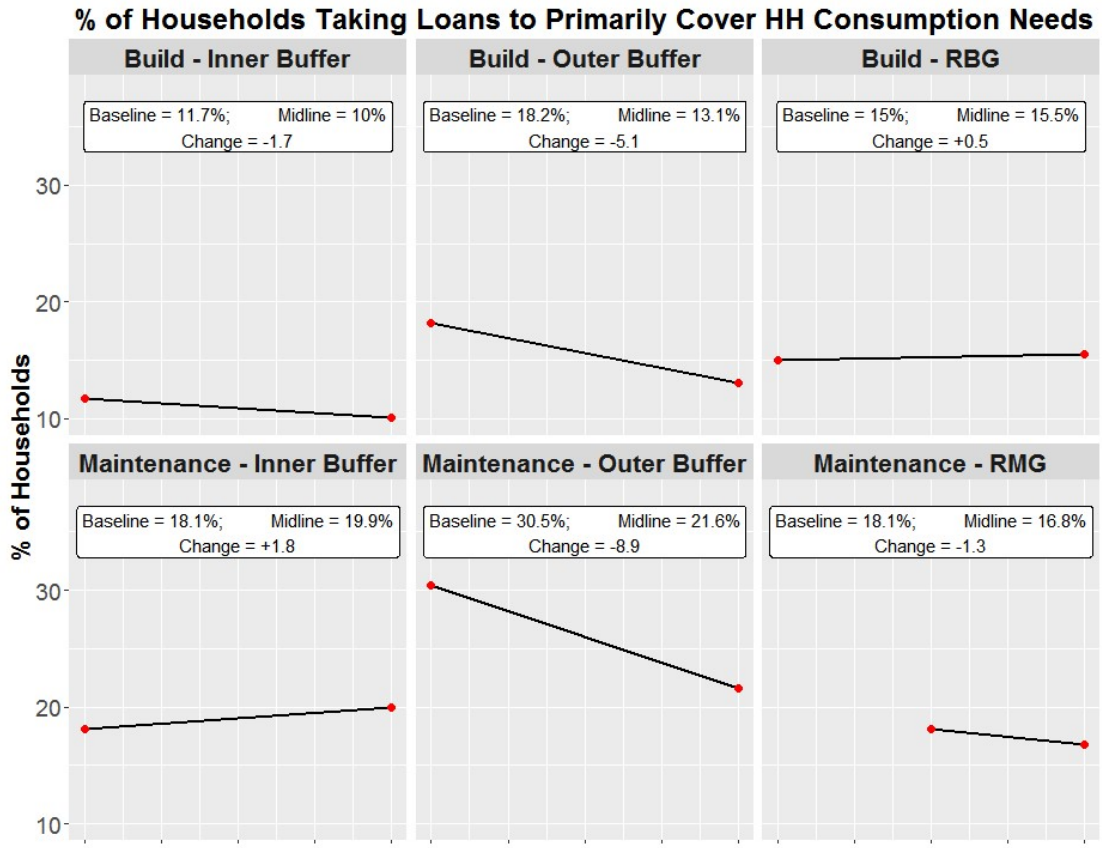
There was no evidence of households relying more on loans as a result of the drought. Across all surveyed domains the proportion of households who had taken out any loan, regardless of purpose, within the past 12 months either remained at a similar level to the baseline or decreased slightly (Figure 24).

Figure 24: % of households with any loan by domain in build and maintenance area



Considering only those loans taken out to cover day-to-day consumption needs, a proxy for an 'emergency' type loan, drought also shows a similar situation. Compared with the baseline survey the % of households taking out loans specifically to cover day-to-day consumption, decreased or stayed the same across all of the domains in the study (Figure 25).

Figure 25: % of households taking loans to cover household consumption needs by domain in build and maintenance area

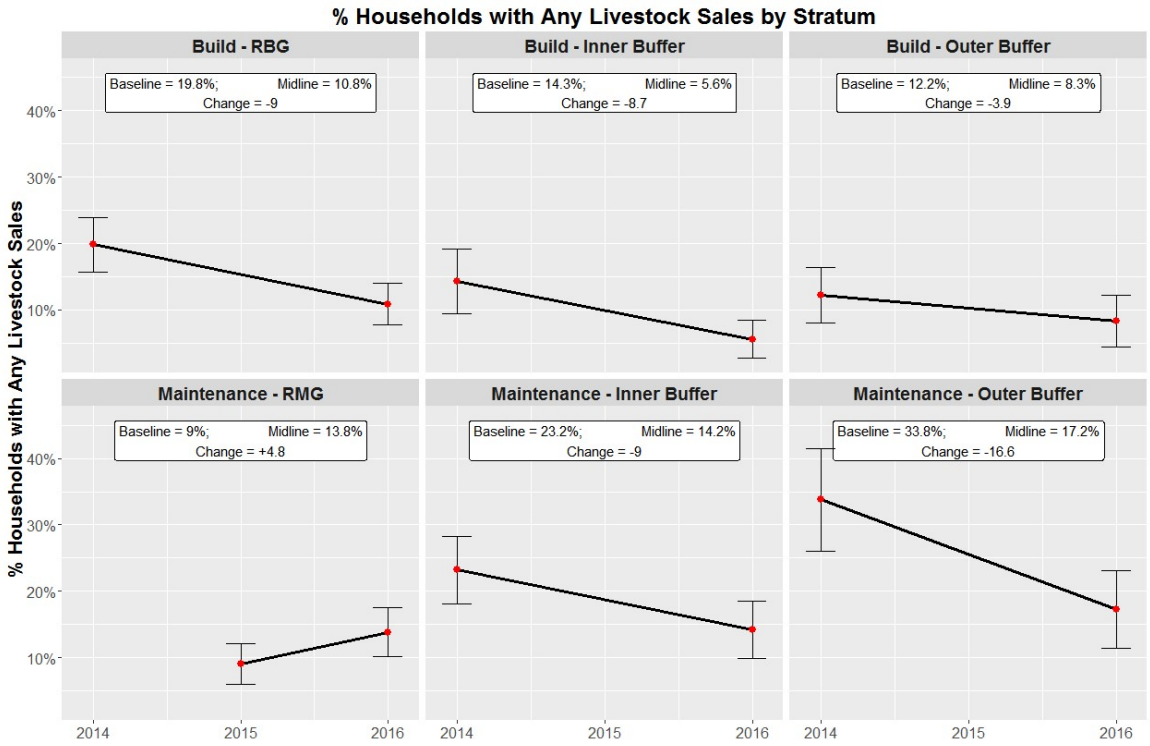


1.3.5 Coping strategy - sale of land / livestock

There was no evidence of widespread distress sales of livestock to deal with the drought. Overall there were considerably fewer sales of livestock in the 12 months to the midline survey than in the 12 months to the baseline survey among households owning livestock (Figure 26).

A specific question in the survey asked why households had sold their livestock; in the midline survey only 17 households in total indicated selling any of their livestock as a coping strategy to deal with the crop failure. Although this is an increase over the baseline survey, where just 3 households indicated crop failure as the reason for selling livestock, it does not indicate that this was a widespread coping strategy. There was no evidence of any sales of land as a response to the drought.

Figure 26: % of households with any livestock sale by domain in build and maintenance area



1.4 Migration trends

Migration is an important factor in changing trends in the Mid and Far West, without which there is an incomplete understanding of the region in broader cultural, social and economic terms. Migration is generally thought of as people moving for economic reasons (primarily, although not exclusively, to India) with many men seeking work. However, migration can often be conflated with movement. Trends of people in the region moving (or 'migrating') for work is part of the picture. Many people move not just for work, but to buy and sell land, relocate (usually to the Terai) or move for education purposes. Hence it is important to understand that migration here also refers to broader movements of people not just for work, but also for other reasons such as the ones outlined above. In addition it is important to understanding migration's effects on changing demography, covered in 1.5 in this section of the report.

Migration for work, especially to India, has been a livelihood strategy for generations of families in many of the RAP areas. The RCA study found that people are even more oriented to this means of earning than in the past and there was a noticeable increasing trend. This is fuelled, people say, by what they feel is an increasingly unpredictable climate and increased risks of farming but also the aforementioned increasing needs for cash. Some families have several migrant workers and others are supported by migrant workers who may not actually have lived in their household. This means that the contribution to households may be greater than it seems when looking only at the number of households with a migrant worker.

Figure 27: % of households with any migrants by domain in build and maintenance area

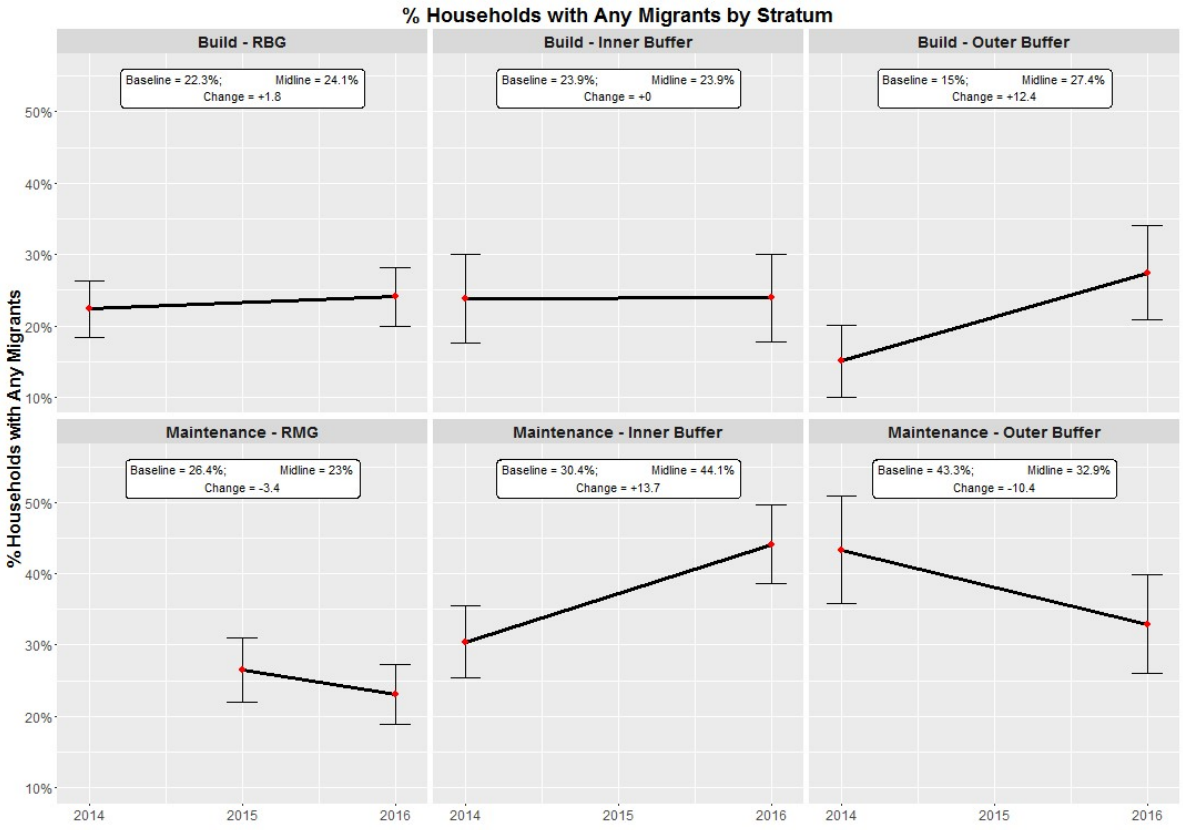


Figure 27 illustrates the changes in the percentage of households who had any current migrants or migrants who had recently returned. Migration stayed at similar levels to the baseline survey in the RBG, RMG and inner build domains; all of these had around 23–24% of households having at least one current or recent migrant member of the household. In the outer build area there was a significant increase in the number of households experiencing migration, from 15% up to 27%. The inner maintenance domain also showed a large increase in migration, from 30% at baseline to 44% at the midline. The maintenance outer domain showed a decrease in the proportion of households with migrant members, from 43% to 33%.

Figure 28 and Figure 29 show the geographic distribution of households with migrants across the region. Largely, migration intensity follows similar patterns at both time points. The most notable difference is in Humla district, where only 4% of households surveyed at baseline had any migrants which increased to 25% at the midline. The map shows the level of migration is highest in the western region away from the road build sites which explains why the outer buffer domain increased where the inner buffer did not. Changes in migration in the other build districts was negligible. Migration in the inner areas of Dailekh and Achham both increased, but the outer areas remained relatively stable. Migrants were still most commonly found in households from Doti, but there was a small downward shift in migration across the district so the midline percentage of households with migration was 39% – reduced from 48% at baseline (Table 21).

Figure 28: Kriged prediction (geo-spatial interpolation) for % of households with migrants at Midline (2016)

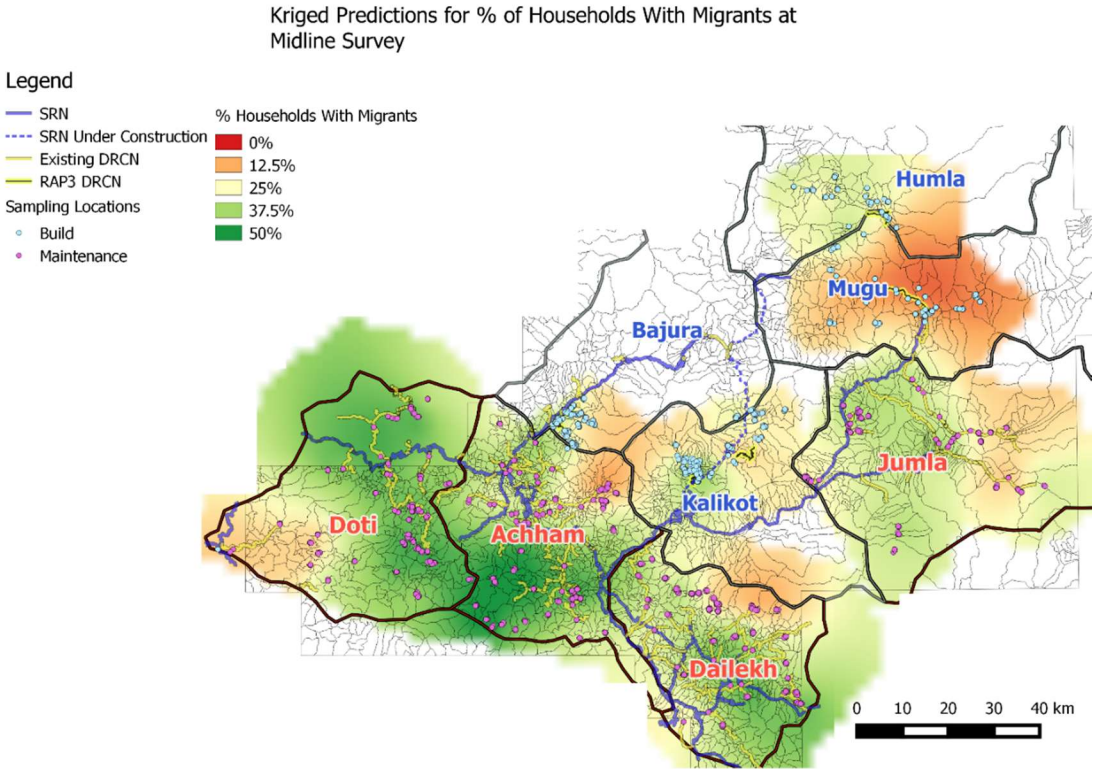


Figure 29: Kriged prediction (geo-spatial interpolation) for % of households with migrants at Baseline (2014)

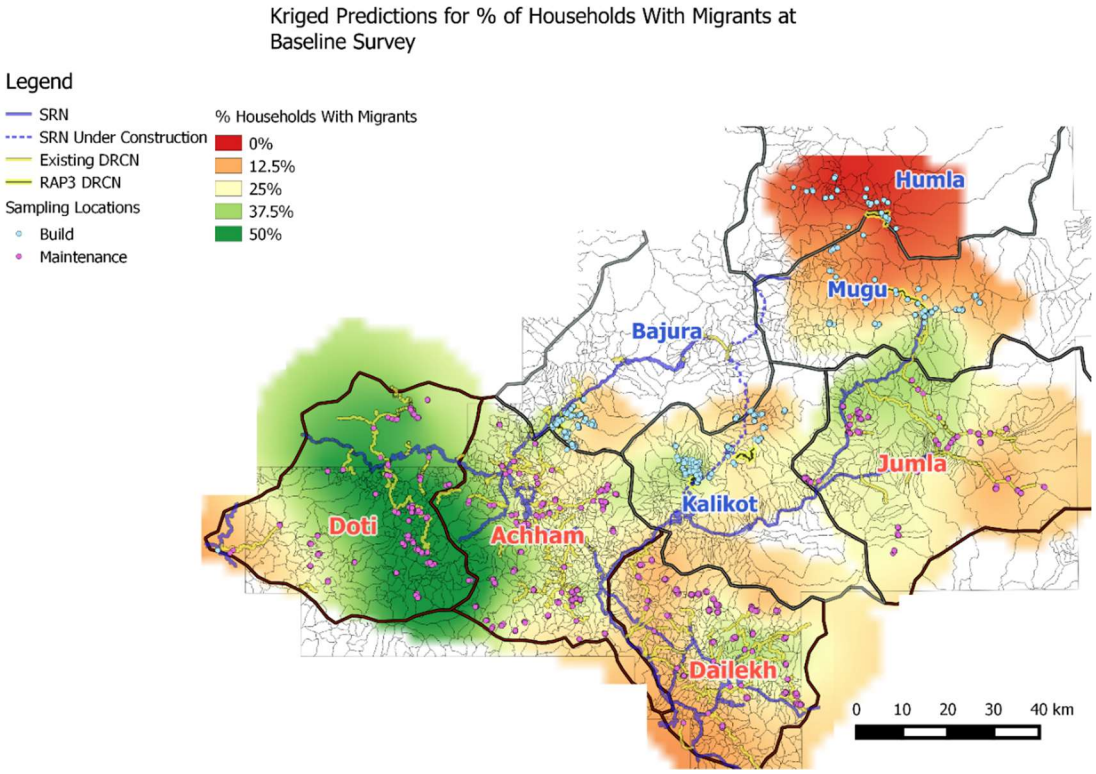
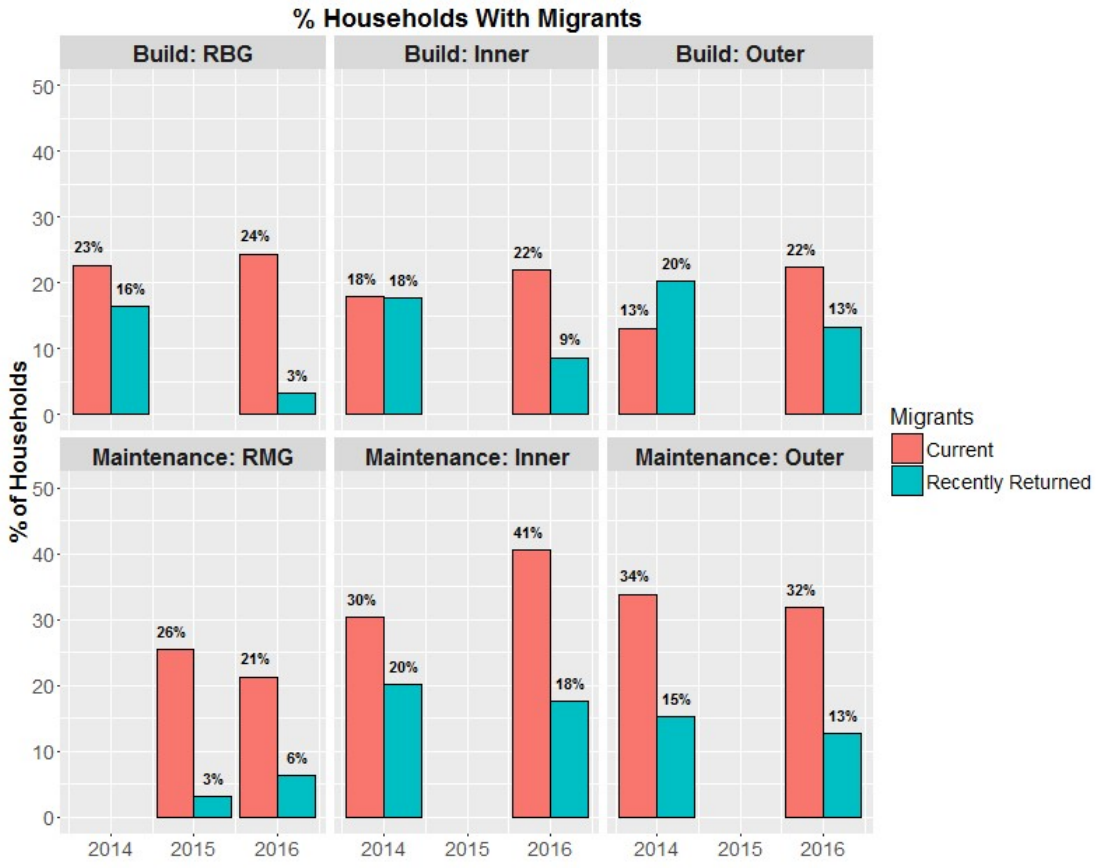


Table 21: % of households with any migrants in each RAP district

District	% Households With Any Migrants	
	Baseline	Midline
Bajura	24%	26%
Humla	4%	25%
Kalikot	28%	27%
Mugu	17%	13%
Achham	29%	35%
Dailekh	21%	30%
Doti	48%	39%
Jumla	26%	29%

Breaking down migration into % of households with current migrants and those with recently returned migrants shows different migration patterns between the two surveys in all of the build domains. All three build domains had more current migrants at the midline, but fewer recently returned migrants. The decrease in recent returnees was particularly apparent in the RBG domain, whilst the increase in current migration was particularly large in the outer domain. At the baseline the outer domain had the smallest proportion of current migrants; but at the midline the proportion of current migrants was approximately the same across the three build domains. The inner maintenance domain showed a sizeable increase in current migrants, where the RMG showed a slight decrease (Figure 30).

Figure 30: % households with migrants by domain in build and maintenance area



The RCA study found that migrant workers in build areas had often decided to return to their villages in 2014 with the hope of getting work on the roads which might explain the higher numbers of returning migrants. However, many explained to us that they have since returned to India because the wages were not comparable with what they could earn in India. Figure 30 does not distinguish between households with one or more than one migrant worker. RCA study found people consistently relying on the predictability of migrant work and that neighbouring households comprising family members may also depend on this even though the migrant worker did not actually live with them. People shared that migration for work was the least risky option as this quote echoed by others demonstrates: '*we can always get a job in India and know that cash is coming in'*.

Table 22 shows a large reduction in the numbers of returning migrants who reported that they had returned to their household for working on the agricultural season. This decline was particularly notable in the maintenance inner and outer domains. At baseline, 42 returning migrants in the inner maintenance domain (40% of the returning migrants) and 27 returning migrants in the outer maintenance domain (50% of the returning migrants) had indicated that they had returned for an agricultural season. At the midline this reduced to just 6 in the inner maintenance domain (6% of the returning migrants) and 2 in the outer maintenance domain (4% of the returning migrants). The RCA study found that people had opted to stay in India with a guaranteed income rather than come home to help with ploughing, which anyway was very late this year.

Table 22: Number of returning migrants who indicated they had returned to the household to work for the agricultural season

	Baseline	Midline
Build - RBG	17	2
Build - Inner	12	9
Build - Outer	39	17
Maintenance - RMG	2	2
Maintenance - Inner	42	6
Maintenance - Outer	27	2

The RCA also gathered insights about people's aspirations and these clearly show an increasing trend towards buying land in the Terai to be nearer to schools and other facilities. Some members of families consequently move to live in the new location to supervise building or for education. This also included people packing up and leaving permanently, both to the Terai and to India.

Figure 31: Destination of migrants by domain in build and maintenance area

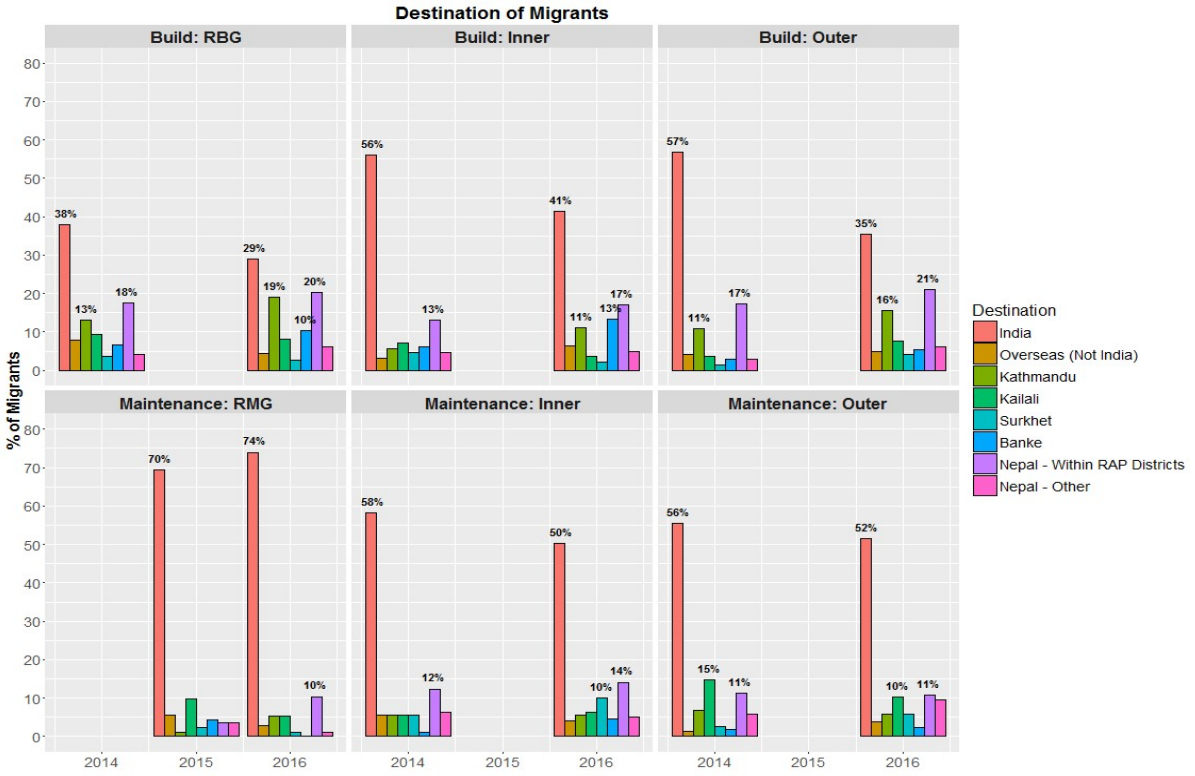
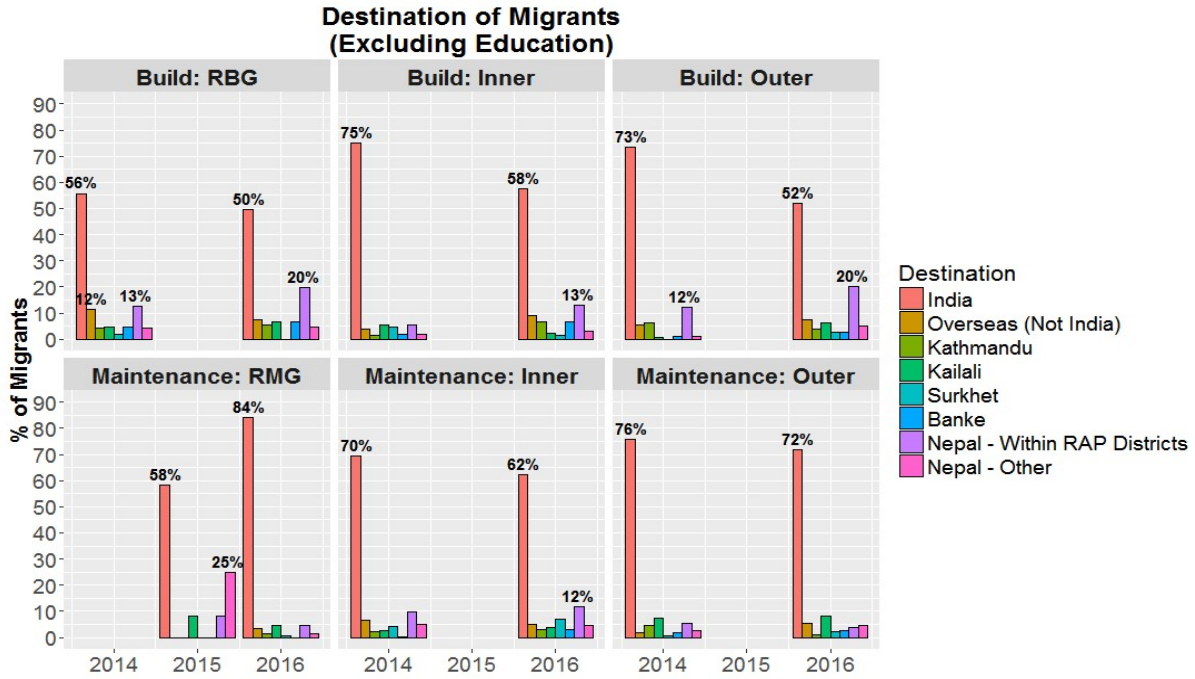


Figure 32: Destination of migrants (excluding for education reason) by domain in build and maintenance area



The primary destination for migrants was India, and remained so at both the baseline and midline. The build area saw proportionally fewer migrants to India than the maintenance, with more migrants going to Kathmandu or more local locations instead (Figure 31).

Reasons for migration largely stayed the same in the maintenance areas, with slight reductions in the proportion of migrants leaving for work and a slight increase in the proportion leaving for education. The same pattern was seen in the build areas, but more pronounced. This was particularly evident in the RBG migrants where more migrants from RBG households were leaving for education (42%) than were leaving for work (39%) at the midline (Figure 33).

Table 23: % of households with 2 or more non-education current migrants by domain in build and maintenance area

	% of Households with 2 or More Non-Education Current Migrants	
Domain	Baseline	Midline
Build - RBG	3%	3%
Build - Inner	3%	4%
Build - Outer	3%	4%
Maintenance - RMG	7%	7%
Maintenance - Inner	7%	12%
Maintenance - Outer	10%	8%

Figure 33: Reason for migration by domain in build and maintenance area

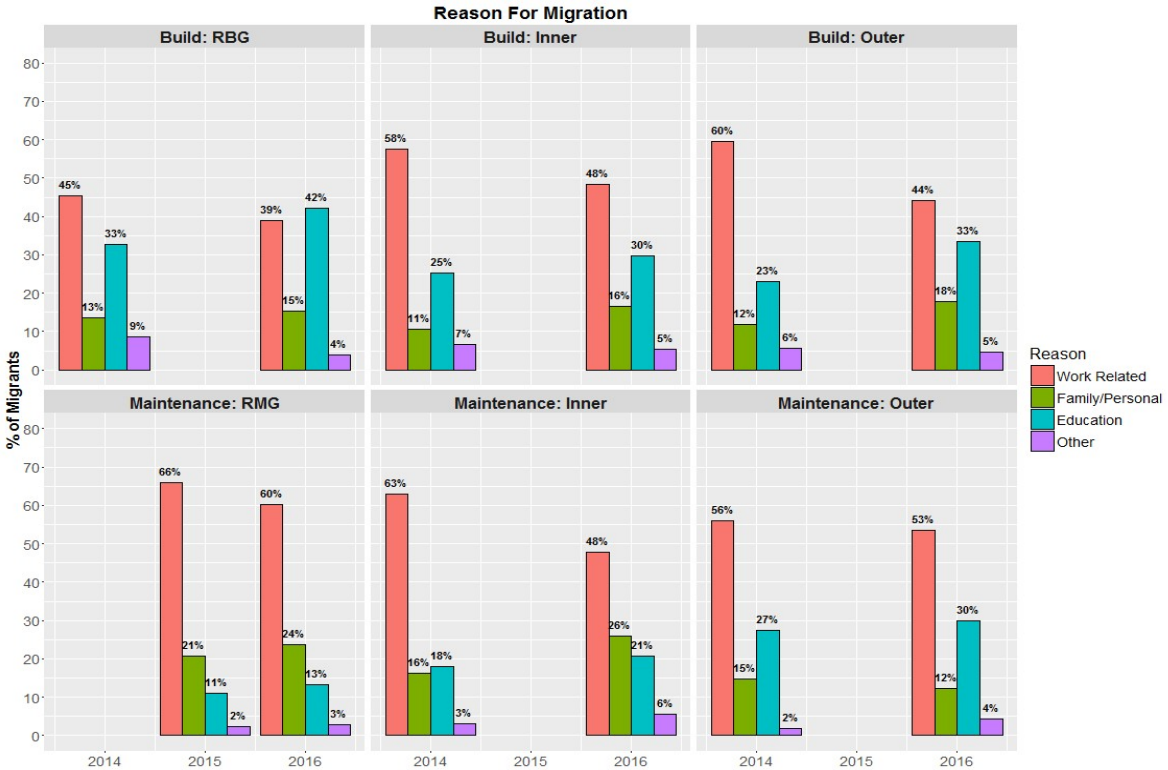


Table 24: % of migrants leaving for education reasons

District	% of Migrants at Midline leaving for education	% of Households at Midline with any migrants leaving for education
Bajura	24%	4%
Humla	63%	19%
Kalikot	15%	7%
Mugu	51%	9%
Achham	15%	7%
Dailekh	23%	8%
Doti	13%	5%
Jumla	44%	14%

Migrants leaving for education showed a strong geographic relationship. Mugu and Humla, the districts with the least migrants overall, had the most households with migrants for educational reasons. Over 50% of the current migrants in these districts had left for education reasons; in less remote districts such as Achham and Doti less than 15% of the migrants had left for education reasons.

1.5 Demography and social change

The demographic breakdown of respondents from the build and maintenance districts is provided below. Compared with the caste breakdown in the inner build domain there is a slight over-representation of upper caste households and a slight under-representation of Dalit households within the RBG domain. Generally, there is a higher proportion of female-headed households in the RMG and inner buffer domains compared with all other domains. The RMG domain also contains a higher proportion of Dalits compared with all other domains. This indicates that targeting of vulnerable groups is well done in the maintenance districts. As indicated in 1.4, changes in demographic make-up of the region is linked with migration patterns. Hence rather than seeing demography as a static picture, it is important to see it in the context of social change.

Table 25: Demographic make-up of build domains at Midline (2016)

		RBG	Inner Buffer	Outer Buffer
Caste				
	Dalit (any)	**11%**	**17%**	**21%**
	Kami	6%	8%	13%
	Other	5%	8%	8%
	Upper Caste (any)	**85%**	**77%**	**77%**
	Brahman (Hill)	12%	7%	10%
	Chhetri	48%	54%	46%
	Thakuri	25%	16%	21%
	Ethnic Group	2%	4%	1%
	Other	2%	2%	1%
Gender of Household Head				
	Female	18%	21%	17%
	Male	82%	79%	83%
Age of Household Head				
	<25	2%	5%	2%
	25–34	21%	20%	21%
	35–44	26%	24%	24%
	45–54	28%	23%	23%
	55–64	15%	17%	19%

		RBG	Inner Buffer	Outer Buffer
	≥65	8%	11%	12%
Household Size	*1–2*	5%	5%	5%
	3–4	19%	27%	24%
	5–6	43%	37%	42%
	7–8	20%	21%	19%
	≥9	14%	10%	10%

Table 26: Demographic make-up of maintenance domains at Midline (2016)

		RMG	Inner Buffer	Outer Buffer
Caste				
	Dalit (any)	**29%**	**13%**	**14%**
	Kami	18%	11%	12%
	Other	10%	2%	2%
	Upper Caste (any)	**67%**	**79%**	**76%**
	Brahman (Hill)	9%	7%	7%
	Chhetri	52%	59%	61%
	Thakuri	6%	12%	9%
	Ethnic Group	2%	7%	8%
	Other	3%	1%	2%
Gender of Household Head				
	Female	32%	31%	18%
	Male	68%	69%	82%
Age of Household Head				
	<25	4%	3%	2%
	25–34	19%	14%	14%
	35–44	34%	26%	26%
	45–54	27%	24%	22%
	55–64	12%	18%	21%
	≥65	4%	16%	15%
Household Size	*1–2*	8%	6%	9%
	3–4	33%	30%	20%
	5–6	36%	37%	37%
	7–8	16%	19%	21%
	≥9	7%	7%	13%

The migration patterns related to an increase in the percentage of female-headed households within certain areas of the study. This is also reflected in a decrease seen in the average household size, across all domains except for the RBG (Figure 35). This indicates that the cumulative effect of deaths and outward migration is larger than the cumulative effect of births and inward/return migration.

The change was particularly acute in the outer build domain where 18% of households were headed by a female at midline compared with just 7% at baseline (Figure 34). In total 11% of households which had a male head at baseline reported having a female head at the midline. Of the female-headed households at midline, almost half had been headed by a male at the baseline and migration rates increased, whilst household sizes decreased. Overall this indicates that these households are predominantly cases where the former, male, head of household has migrated from the household leaving his wife as the new head of household.

The increase in female-headed households was likely the result of increases in migration of former household heads – households where the gender of the head changed from male to female were by far the most likely to have any migrants (61%) when compared with households with male heads at both surveys (22%) or households with female heads at both surveys (39%).

Figure 34: % of female-headed households by domain in build and maintenance area

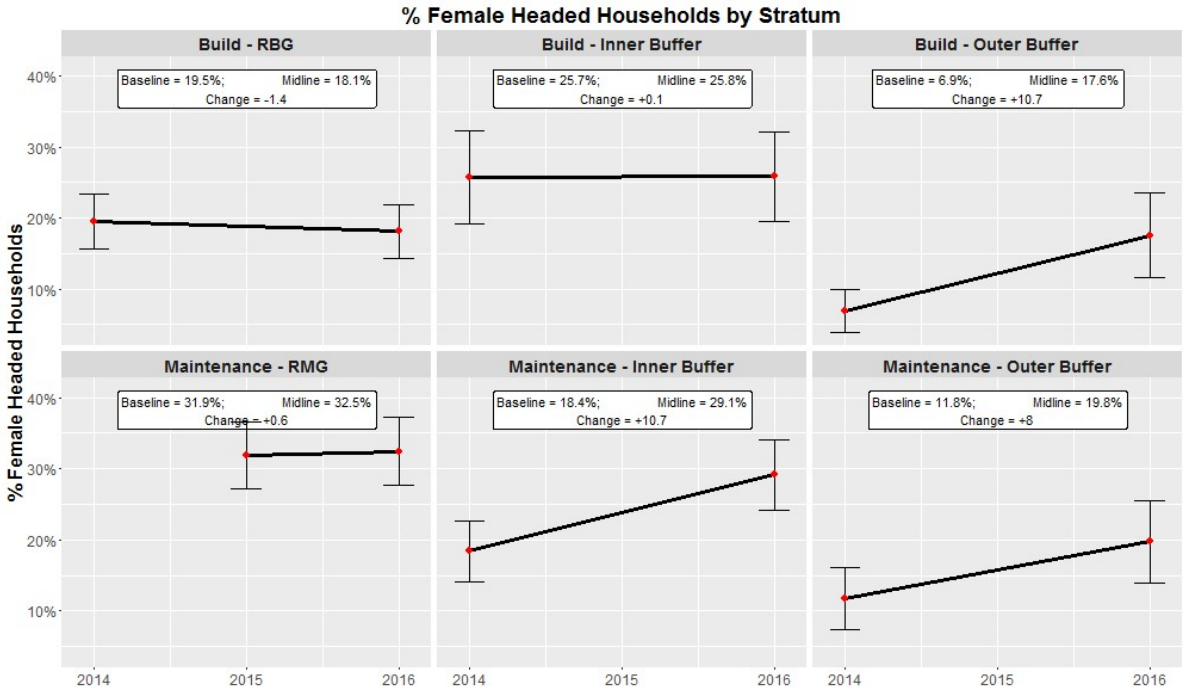


Figure 35: Average household size between baseline and midline by domain in build and maintenance area

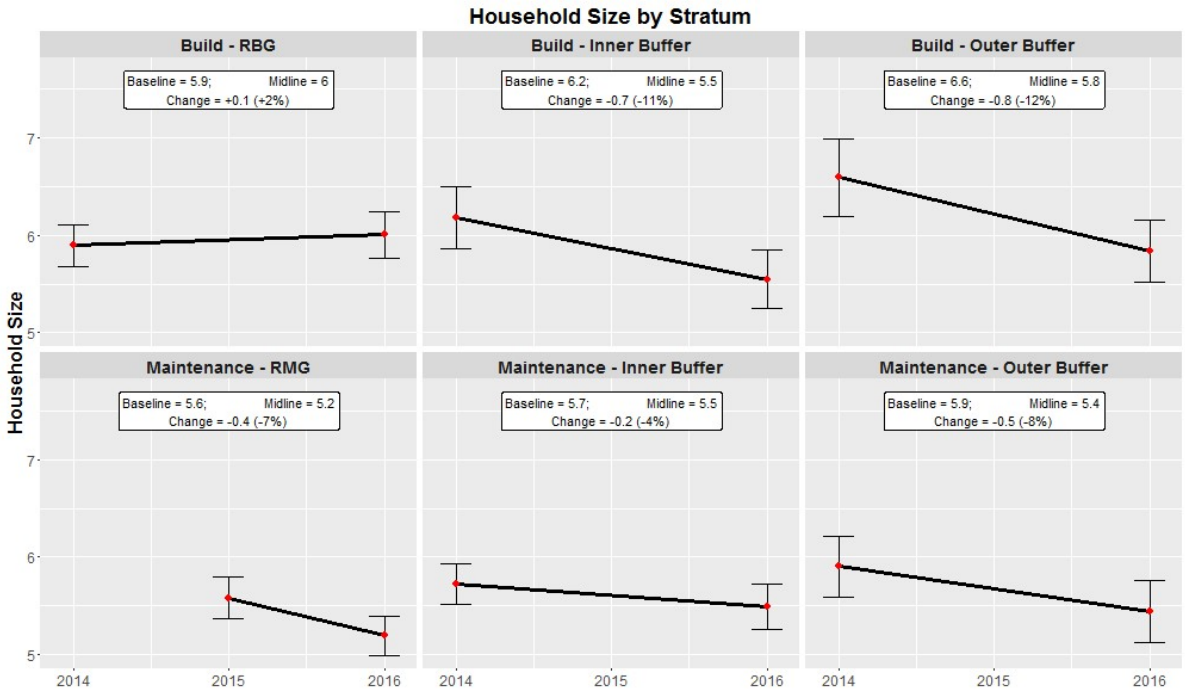


Table 27 summarises the changes in household size and level of migration of household members by the genders of the household heads at baseline and midline which shows a clear migration effect – with outward migration of male heads from the region outpacing the return migration of these heads.

Table 27: Change in household head, size of household and migrant households between baseline and midline

Gender of Head		% of Total	Household Size		% with Any Migrants	
Baseline	Midline		Baseline	Midline	Baseline	Midline
Male	Male	72%	6.1	5.9	19%	22%
Female	Female	12%	4.8	4.4	45%	40%
Male	Female	11%	6.0	5.0	18%	60%
Female	Male	5%	5.0	5.5	50%	22%

Given that two years had passed since the baseline survey, it would have been expected to see an average increase in the age of the household head of two years if the same household heads had remained in place. In all domains, except for the RMG, the average increase in age of the household head was greater than two years. For the RMG domain there was in fact a reduction in the age of the household head between the two surveys. As the baseline for this domain was conducted in 2015 rather than 2014 only a one-year increase in average age would have been expected but the reduction may have occurred as a result of return migration or deaths of older household heads (Figure 36). These trends were reflected with a consistent increase across the domains, except for the RMG domain, in the percentage of households which were headed by a person aged over 65 (Table 28).

Figure 36: Average age of household between baseline and midline by domain in build and maintenance area

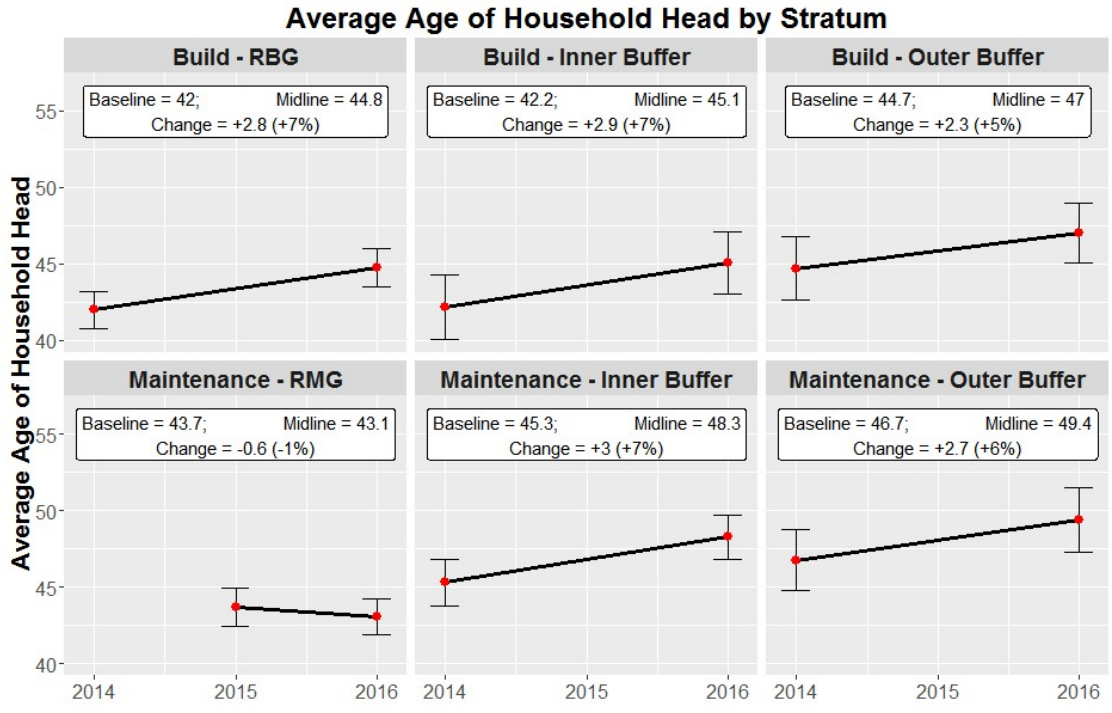


Table 28: % of households with head aged above 65 years

Domain	% Households with Household Heads Aged > 65	
	Baseline	Midline
Build: RBG	3.1%	7.2%
Build: Inner	4.8%	8.6%
Build: Outer	5.0%	9.1%
Maintenance: RMG	4.4%	3.4%
Maintenance: Inner	7.2%	13.1%
Maintenance: Outer	8.3%	12.6%

1.5.1 Labour constraints and capacity to be involved in RAP groups

In order to understand further the profile of typical beneficiaries of RBG work, we need to identify those families that may be especially labour constrained and would be likely to find participation in RBGs problematic. A variety of 'labour-constraints' definitions were derived developed by the MEL team. The parameters suggested were:

- Households with one or fewer adults (aged 15–64) within the household
- Households with more children (aged under 15) than adults
- Households where at least one member suffered from a chronic illness or disability
- Female-headed households with at least one child under school age (under 5)

Table 29: Breakdown of % of households with a specific labour-constraint by domain

Domain	One or fewer adults	More children than adults	Chronic illness	Female-headed households with at least one young child
Build: RBG	6%	32%	24%	9%
Build: Inner	9%	34%	22%	13%
Build: Outer	8%	33%	29%	11%
Maintenance: RMG	10%	29%	17%	12%
Maintenance: Inner	11%	31%	16%	17%
Maintenance: Outer	10%	38%	19%	12%

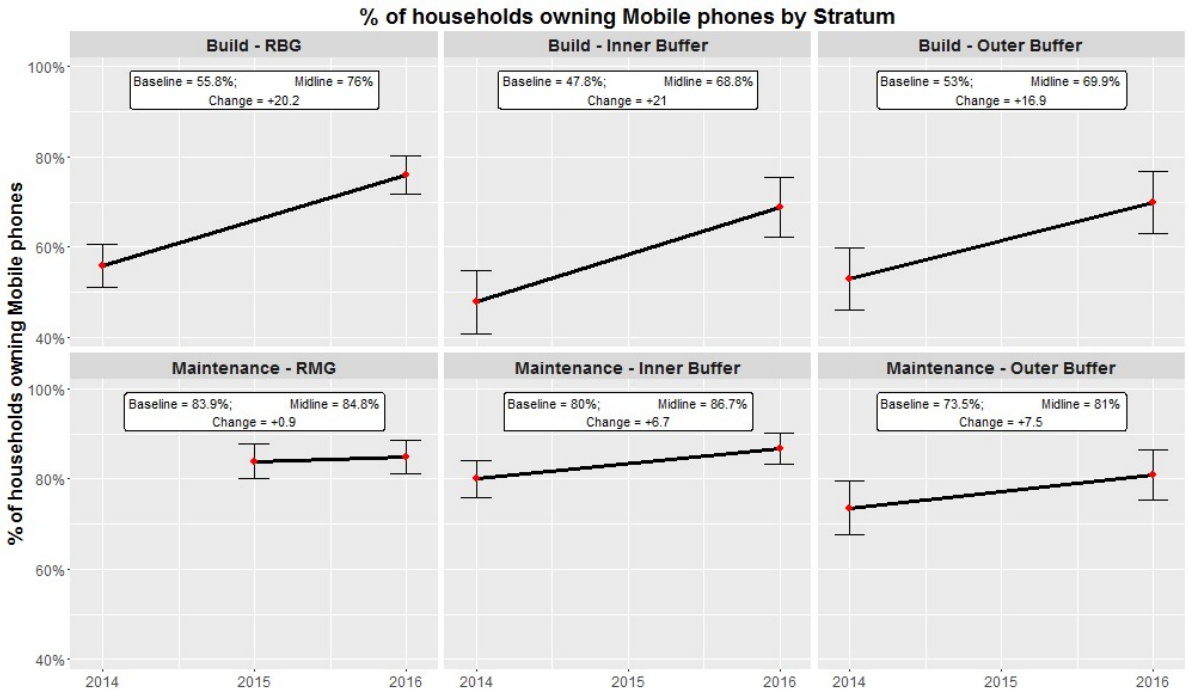
1.6 Increasing need for cash

One of the top issues for conversations within the RCA study when talking about change was the increasing need for cash, mentioned in Table 4. Subsistence lifestyle is no longer possible as cash is routinely needed for phone credit, electricity, education and health costs, and during the drought, for additional food. The following sub-sections look at three elements of this from the survey that serve as proxies for the need for increased cash needs: phone ownership, electricity connections and school costs.

1.6.1 Mobile phone ownership

Mobile phone ownership increased substantially in all three build area reporting domains. Increases were fairly consistent across all three domains with around 70% of households owning mobile phones at the midline survey compared with around 50% at baseline.

Figure 37: % of households owning mobile phones by domain in build and maintenance area

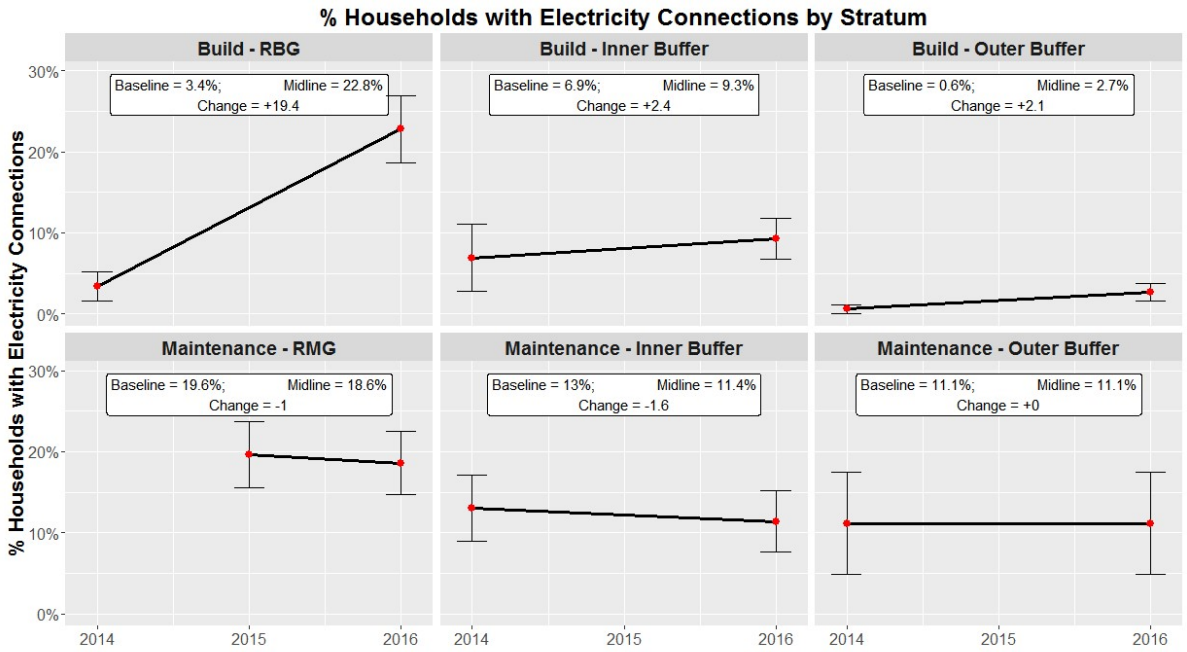


Increases were also seen for the maintenance areas, although the baseline ownership of mobile phones in these areas was already high (Figure 37). The RCA study confirms that people have working mobile phones and, with better electricity connections than in 2014, keep these charged. A few own more phones than in 2014 and some now have smartphones (often the first priority of a new migrant worker in India to provide for their family and often included in dowry requests) and the only reason a few families have fewer phones than in 2014 was because family members have taken them when they moved for education or phones have broken and not been replaced.

1.6.2 Electricity connections

As noted at the beginning of this section on contextual change, one of the most talked about changes noted in the RCA study was electricity connections and more reliable power supply. New household electricity connections, new pylons (often placed along roads) and new or improved hydro-power plants were conspicuous in Doti, Achham and Bajura study areas. Household electricity connections are mostly metered and this as well as the initial connection charge have increased the need for cash.

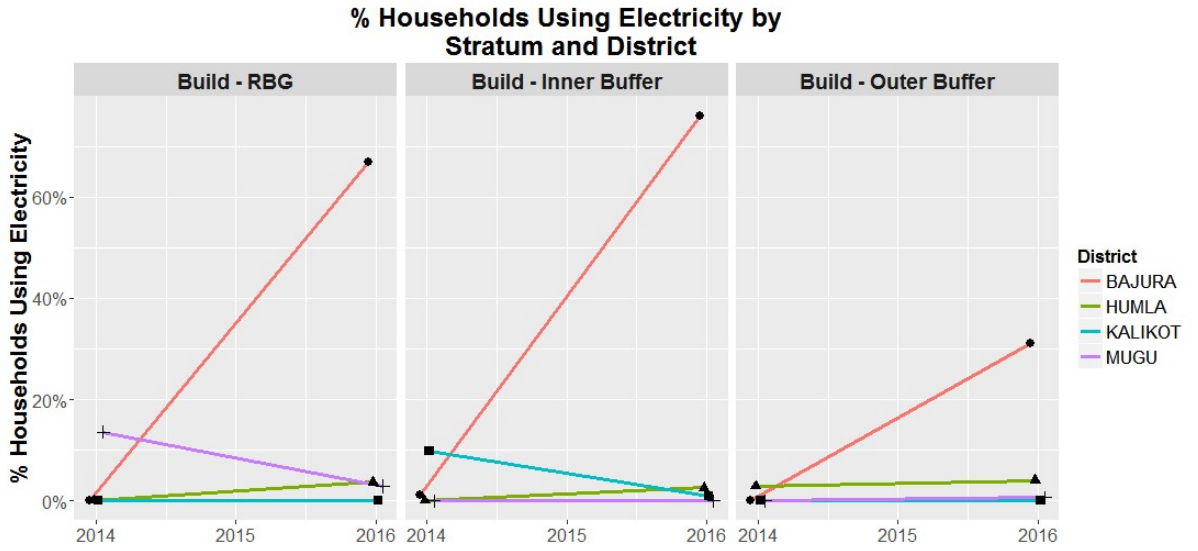
Figure 38: % of households with an electricity connection by domain in build and maintenance area



Electricity connections increased significantly for RBG households between the baseline and midline surveys. At the baseline only 3% of RBG households used electricity connections as the main method for lighting their house. This increased to 23% at the midline survey. This outstripped the rate of increase seen in the inner and outer buffer domains of the build area dramatically, indicating a highly significant difference between the RBG and the remainder of the local population. **However, this difference was largely the result of geographical differences between the two domains and there is no evidence of a significant difference between the direct RAP beneficiaries in RBGs and non-direct beneficiaries in the inner domain**, after adjusting for the geographic variables. There were very large increases in electricity usage across all of the domains within Bajura, and either no change, or slight decreases, in all of the other build districts (Figure 39). In the RCA study it was noted that improvements in electricity provision in Bajura are due to the installation of new hydro-electric power plants which supply 24-hour electricity to nearly all the houses in one study village and 19 hours per day in the second study village in that district (with regular and predictable load shedding at night).

The population among road building groups is fairly evenly distributed across the four build districts, with Bajura containing the largest proportion of this population (32%). However, the population within the inner buffer areas is disproportionately located within Kalikot and Mugu, rather than Bajura which only makes up 11% of the inner buffer population. Therefore when considering the entirety of the RBG and inner buffer domains there are more RBG households using electricity connections but this is not the result of participation within the RBG.

Figure 39: % of households using electricity in each of the build districts in each domain between baseline and midline



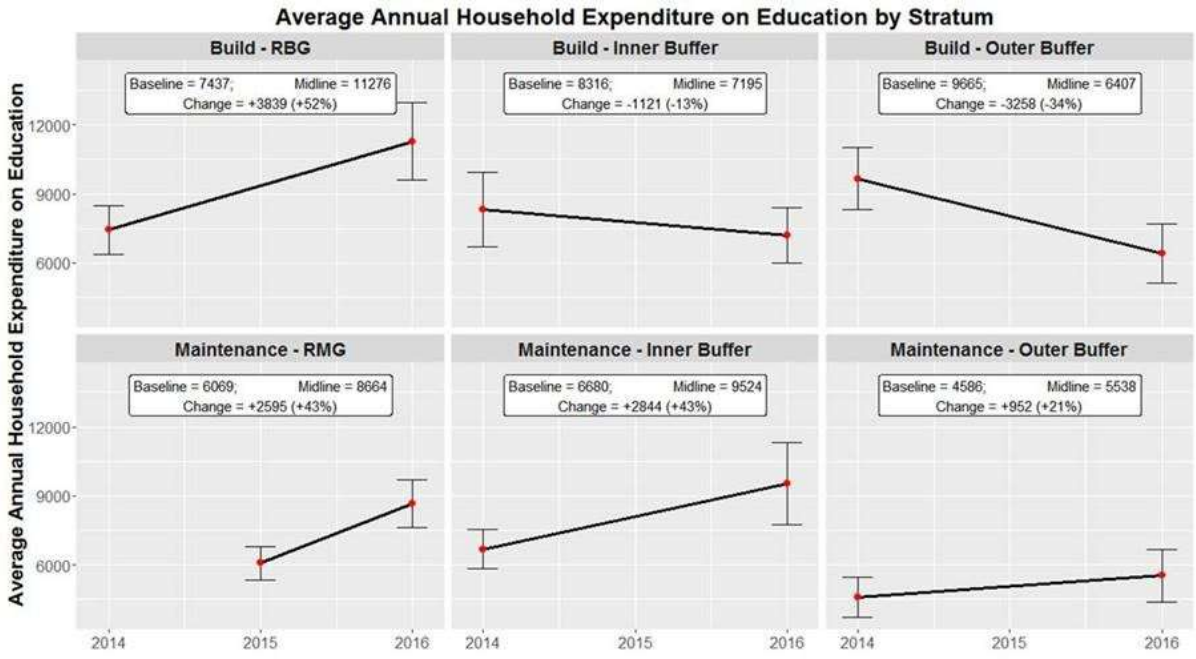
There were no significant changes in the electricity connections in the maintenance area. The results from the RMG domain show that a significantly higher proportion of households had electricity connections within the RMG domain compared with the equivalent inner area domain.

1.6.3 Education Costs

Households in the RBG domain spent an average of 1.5 times as much on their children's education per annum in 2016 compared with 2014, over 11,000 NPR per year on average. This far outstrips the rate of inflation between the two years (16%) and is highly significantly different from the changes in educational spending in the other domains in the build area, where the average amount spent on education decreased between the two surveys. The RCA found that families in Bajura were sending their younger children to private schools (known as 'boarding schools') in preference to state schools which they perceived as inferior because they had the RAP wages to do so. They shared concern that they may not be able to manage this after RAP has finished. When people talked about the increasing need for cash one of the reasons was school costs irrespective of the type of school children attend. They said that in addition to admission fees and uniforms, there were many cash demands made by the schools throughout the year referred to rather vaguely as '*support school costs', 'furniture costs'* or '*maintenance costs'* . The increased expenditure on schools may also reflect the growing trend to send promising children in the family out of the village for education as aspirations for waged and salaried work have increased.

The average amount of money being spent on children's education per year was similar for direct RAP beneficiaries of RMGs as it was for non-direct beneficiaries in the inner domain and spending in both of these domains increased above the rate of inflation. Outer maintenance areas did see a significant increase in spending between surveys, but spent considerably less per year when compared with the RMG and inner maintenance domains. Unlike RBGs, RMG members are supposed to be the poorer families and so less likely to be able to spend on education.

Figure 40: Average annual household expenditure on education by domain in build and maintenance area



Part 2: Impact of RAP on Direct Beneficiaries

The previous section provided an assessment of changes in the Mid and Far West region that are felt by *everyone* in all domains. Many of the effects were disaggregated by RAP beneficiary groups (the RBG and RMG domains); however, this was provided to show the degree to which the domains were affected overall. In contrast, this section focuses specifically on the impact of RAP direct beneficiaries and revisiting poverty and vulnerability to assess more closely the impact of continuous participation in RAP groups compared with the non-direct beneficiaries in the inner domains. It also looks at individual indicators related to household finances (income and savings), human capital (health and educational attainment) and physical capital (land and assets).

Summary of Part 2:

Revisiting poverty and vulnerability for RBGs (see 2.1)

- Those who have remained a part of RBGs over the 2 years see an increase in the wellbeing although most are still beneath the poverty line.
- The overall PMT score for RBGs stayed the same, although there is significant variation when disaggregated by those beneficiaries who have remained in RBGs throughout baseline and midline, those who have dropped out or recently joined, and those who have never been part of RBGs (non-beneficiaries in the inner build domain).
- Participants in RBGs are less vulnerable to the effects of the drought than non-beneficiaries – the drop in food diversity is less severe for RBGs pointing to a consumption-smoothing impact of RAP wages.
- As mentioned in Part 1, RMGs tend to be poorer at the outset than comparable groups.

Household finances (income & savings) (see 2.2 & 2.3)

- Although largely a programme effect, incomes have increased for those in RBG/RMGs compared with those who are non-beneficiaries.
- RBGs maintain a constant source of income due to the security of work with RAP whereas other groups see sources of income falling.
- The relative contribution of remittances to total income has dropped for RBGs, although the median total income remains higher than average in the region.
- 72% of RBGs participate in savings group, highlighting that not all are taking part in the mandatory scheme.
- Median savings for RBGs are higher than for non-beneficiaries.

Human capital (health & education) (see 2.4)

- Members of RBG & RMGs are more likely to spend money on treatment for illnesses than other comparable groups.
- There is a large increase in the use of local shops to purchase medicine as an alternative to obtaining treatment from specific healthcare facilities.
- There is strong evidence to suggest that households in the build region who had participated in RBGs spent significantly more on education than households who had not participated.

Assets (see 2.5)

- There has been a large increase in the purchase of consumer assets by RBGs compared with other groups.
- There has been a significant increase in the number of productive assets purchased by RMGs. However there has been no significant change in case of RBGs. There is a large increase in consumer assets for RBGs compared with other groups.

2.1 Revisiting poverty and vulnerability for RBGs

The total number of RBGs has grown since the baseline because of the need for extra people required to complete work on RAP. A significant percentage of households in the inner build domain (non-direct beneficiaries) at baseline later became members of RBGs at the baseline. Although largely out of the control of MEL, these results have interesting and relevant findings of their own, shedding further light on the impact of a household participating in a RAP group consistently over two years.

The results show the clear difference between those who were part of the RBG at both surveys (hence throughout the duration of RAP so far) versus those who were at some point a part of a RBG but then dropped out and those who were never part of a RBG during both surveys (the 'true' control group in the inner build domain). The results show that RAP direct beneficiaries in RBGs who were part of a RBG throughout RAP so far were less vulnerable to the effect of the drought.

The widespread nature of the road building programme relative to the population size in the four build districts means that using the planned domain structure to assess the impact of RBG participation would not provide a meaningful comparison. Using households surveyed as part of the RBG, Build Inner Buffer and Build SED domains, four new categorisations were created to assess the RBG impact.

Table 30: % of households in build domains that were never part of RBGs, sometimes part of RBGs, always part of RBGs

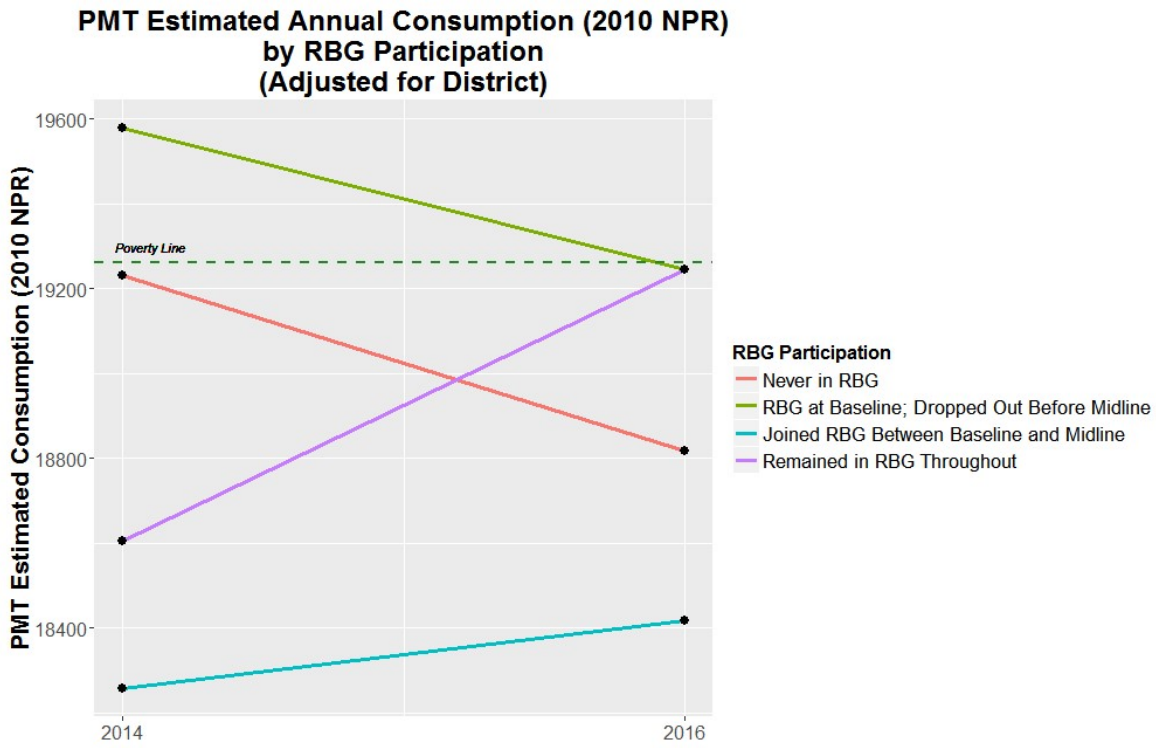
Category	Sample Size (Overall)	Sample Size (By Original Domain)	Sample Size (By District)
Never participated in RBG	263	RBG = 12 Inner Buffer = 239 SED = 12	Bajura = 98 Humla = 16 Kalikot = 101 Mugu = 48
Participated in RBG at Baseline but did not participate at Midline ('RBG Leavers')	217	RBG = 97 Inner Buffer = 11 SED = 109	Bajura = 173 Humla = 10 Kalikot = 11 Mugu = 23
Participated in RBG at Midline but did not participate at Baseline ('RBG Joiners')	151	RBG = 39 Inner Buffer = 85 SED = 27	Bajura = 11 Humla = 38 Kalikot = 70 Mugu = 32

Category	Sample Size (Overall)	Sample Size (By Original Domain)	Sample Size (By District)
Participated in RBG at both Baseline and Midline ('RBG Remainers')	536	RBG = 267 Inner Buffer = 84 SED = 185	Bajura = 124 Humla = 155 Kalikot = 78 Mugu = 179

The new categorisations do not follow the same roughly even distributions of households among the four district, as was the case in the original domain definitions. Two districts in particular follow very different patterns from the general trend. In Humla only 16 households surveyed never had any members participating in the RBG; in Bajura there was a very high rate of RBG members from the baseline no longer participating in the RBG at the midline.

As a result of the disparity between the districts within each category the estimates presented for indicators will be adjusted for district. This enables a fair comparison for the RAP between the four categories which is not biased by any geographic differences in the composition up of the groups. However, this does mean that the estimates will not be directly representative of the situation within the categories but what we would expect to see if the distribution of the four categories was equal across each of the four districts.

Figure 41: Change in average PMT consumption between direct and non-direct beneficiaries in RBGs



Overall there was a highly significant increase in the PMT consumption estimate for the group of households who had remained in the RBG across both surveys. The changes over time for households within the other three categories were not statistically significant, but the general trends were for a small increase in the PMT estimate over baseline for households joining the RBG group and small decreases in the PMT estimate for the households who had dropped out of the RBG or had never had a member participating.

Table 31: PMT consumption (2010 NPR) for RBG beneficiaries

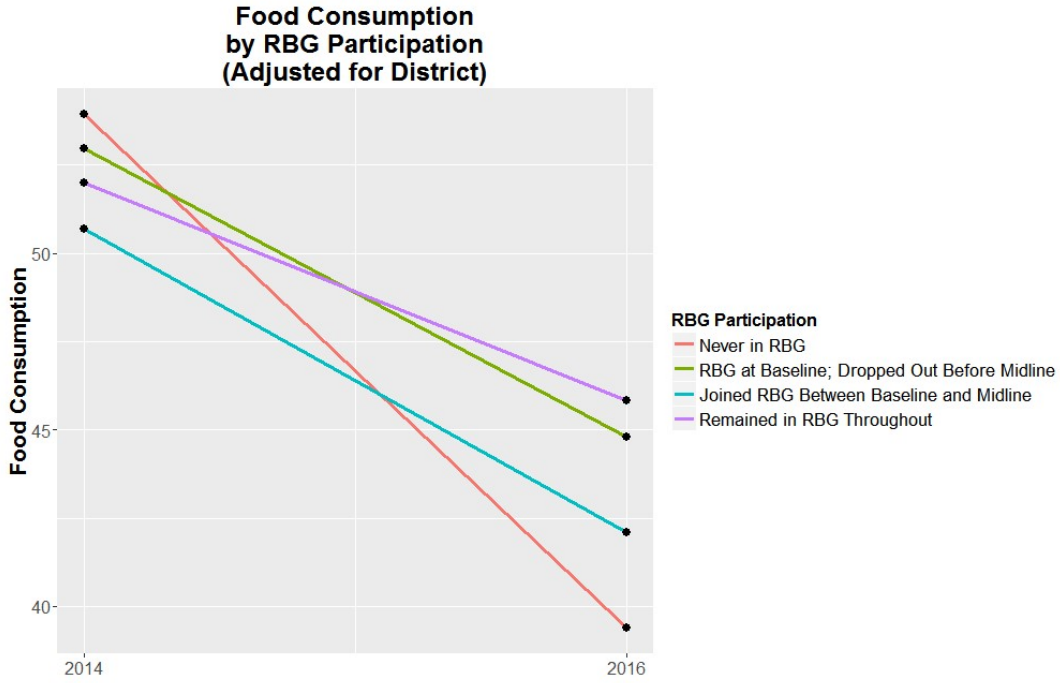
Category	Baseline	Midline	Change
Never participated in RBG	19,231	18,818	-413 (-2%)
Participated in RBG at Baseline but did not participate at Midline ('RBG Leavers')	19,578	19,245	-333 (-2%)
Participated in RBG at Midline but did not participate at Baseline ('RBG Joiners')	18,258	18,417	+159 (+1%)
Participated in RBG at both Baseline and Midline ('RBG Remainers')	18,605	19,244	+640 (+3%)

The group of households who had remained part of the RBG from the baseline until the midline did not have a significantly different estimated PMT at the midline survey from the group of households who were never part of the RBG (p=0.530). However, the 'difference-in-difference' between these groups was statistically significant at the 5% level (p=0.013). This suggests that, although there was no difference in the outcome of the two groups at midline, the results for households continuously participating in the RBG were seeing a more beneficial trend over time when compared with households never participating in the RBG.

Very similar results were seen when comparing the households remaining in the RBG with the households who had left the RBG between the baseline and midline surveys. There was no significant difference in the comparison between the groups at the midline survey or the baseline survey but there was evidence of an effect in the trends over time. This suggests that households continuously participating in the RBG were seeing a more beneficial trend over time with regards to the estimated household consumption when compared with households who stopped participating in the RBG.

There was no evidence of any significant differences when comparing those who had joined the RBG after the baseline survey and those who never joined the RBG.

Figure 42: Food consumption by RBG participation (adjusted for district)



The food consumption score saw highly significant reductions in all four categories ($p<0.001$ within all four categories). The largest decrease came within the households who never participated in the RBG, a reduction of 15 points on average whilst the smallest decrease came for households who continuously participated in the RBG, only 6 points on average.

Table 32: Food consumption score at baseline and midline for direct and non-direct beneficiaries

Category	Baseline FCS	Midline FCS	Change
Never participated in RBG	53.9	39.4	-14.5 (-27%)
Participated in RBG at Baseline but did not participate at Midline ('RBG Leavers')	53.0	44.8	-8.2 (-15%)
Participated in RBG at Midline but did not participate at Baseline ('RBG Joiners')	50.7	42.1	-8.6 (-17%)
Participated in RBG at both Baseline and Midline ('RBG Remainers')	52.0	45.8	-6.2 (-12%)

The group of households who had remained part of the RBG from the baseline until the midline did not have a significantly different estimated PMT at the baseline survey from the group of households who were never part of the RBG ($p=0.403$) but there was strong evidence that there was a difference between these two groups at midline ($p=0.001$). The 'difference-in-difference' between these groups was highly statistically significant ($p<0.001$). This suggests that direct RAP beneficiaries in RBGs,

although suffering from a reduction in food consumption diversity between the survey rounds, were not as badly affected as the non-direct beneficiaries by a highly significant margin.

At the baseline there was a statistically significant difference between the group of households who never participated in the RBG and the group of households who joined the RBG after 2014. The food consumption score was an average of 3 points higher for the group who were never in the RBG. There was no significant difference between the groups at midline, but there was strong evidence of a difference-in-difference effect showing that households joining the RBG after 2014 saw a less severe drop over time compared with households not joining the RBG (p=0.008).

There was no evidence of any significant differences in food consumption score between households who remained in the RBG and households who left the RBG after the baseline survey.

2.2 Household finances (income)

2.2.1 Defining income types (cash and in-kind)

Table 33 outlines the different income sources accounted for in the questionnaire, which include a mixture of cash and in-kind income. Respondents were asked to recall income over the past 12 months for all of these sources and provide an approximate valuation for goods in kind. The RCA study found that people find it quite difficult to value goods in kind and gifts especially when they have been purchased outside of Nepal.

Table 33: Definition of different types of income sources

Category	Income Sources Accounted for
Remittances	Either money or goods (valued in kind) obtained from: i) Migrant household members ii) Household members returning to the household iii) Gifts from non-household members
Wages	Paid employment through informal contract, short-term contracts or longer term contracts. Includes benefits in kind.
Food sales	Sales of livestock-related products (milk, ghee, eggs, animal hides, manure etc.)
Animal sales	Sales of livestock
Other farm income	Sales (or rentals) of draft animals, tractors, grinders, threshers, seeds, fodder, wood, charcoal, herbal plants
Enterprise	Income from any non-agricultural enterprises run by household
Crop sales	Sales of any harvested crops
Benefits	Value of benefits received (cash or in-kind) from nutritional supplementation for mothers, elderly persons' allowance, disability allowance, maternal incentive scheme, single women's allowance, food for work programme

2.2.2 Change in income

Figure 43 shows the income change across all domains. Average annual household incomes over the most recent 12 months increased dramatically within the RBG member households which is probably a programme effect of the cash transfer by participating in the RBG. 86% of RBG households reported a larger total household income specifically from wages in the midline than in the baseline, compared with 53% within the inner buffer and 32% within the outer buffer. Median incomes for households within the build inner buffer generally rose well above the rate of inflation for the inner buffer. Many households within the inner domain are also participants within the RBG program, which may explain a large amount of the increases seen in this domain. Incomes in the outer domains decreased. In

interpreting these results, it should be noted that this is not broken down by each district, hence higher incomes in one district may be offset by lower incomes in another district.

At the baseline survey in the maintenance districts the median income for the outer buffer households was significantly higher than that of both the inner buffer and RMG households ($p<0.001$). The decrease in the income within the outer buffer domain, coupled with the increases in the inner buffer and RMG domains result in the incomes for the outer buffer being significantly lower than those in both the inner and RBG domains at the midline ($p<0.001$).

Figure 43: Median value of annual household income between baseline and midline by domain in build and maintenance area

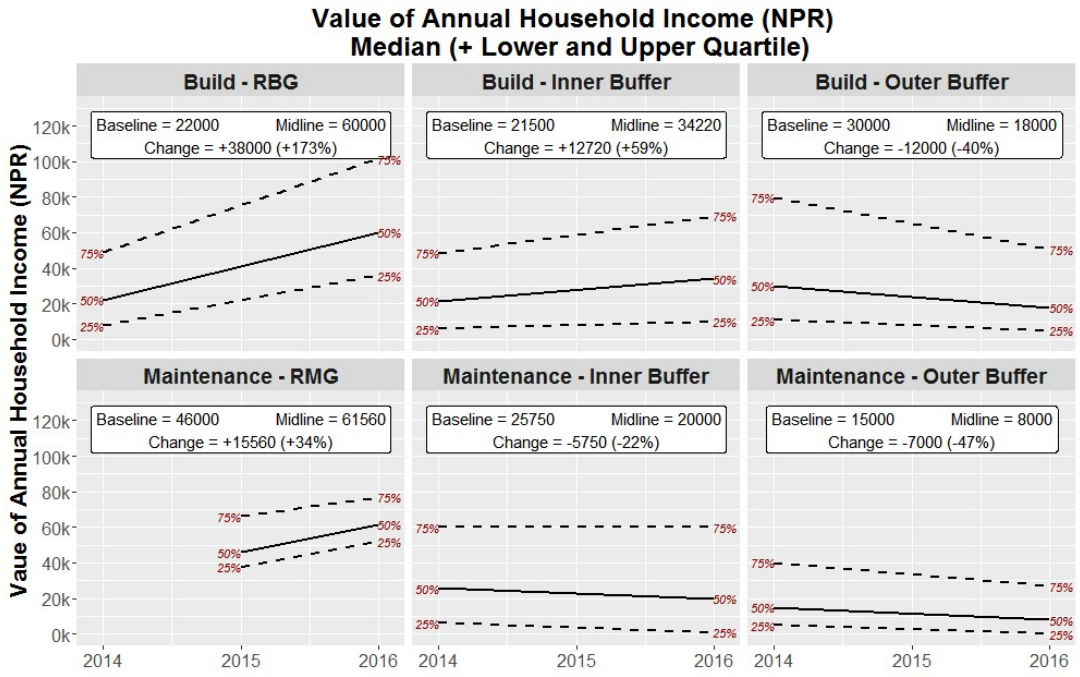


Figure 44: Median value of 12-month annual household income for RBG beneficiaries

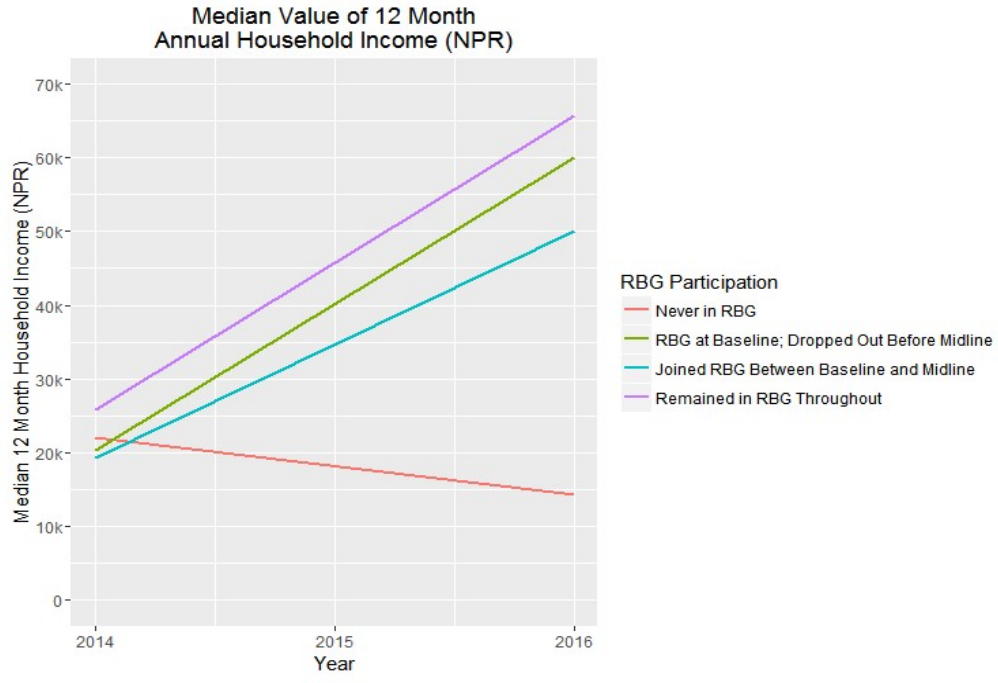


Figure 44 clearly shows that those who were a part of RBGs at any point have seen an increase in income compared with those who have never been in a RBG who have seen incomes fall.

Table 34: % households with increase in income and the value of income increase

Domain	% of Households with Increased Value of 12-Month Income from Wages	Median Change in 12-Month Income from Wages
Build: RBG	86%	+45,250 NPR
Build: Inner	53%	+31,000 NPR
Build: Outer	32%	+3,000 NPR
Maintenance: RMG	91%	+12,666 NPR
Maintenance: Inner	24%	+9,700 NPR
Maintenance: Outer	22%	0 NPR

Incomes increased within the RMG domain, but not to such a large extent as within the RBG group. This may be the result of a large majority of RMG member households having participated in the RMG programme for several months before the RMG baseline in 2015, therefore some of the increased effect of wages was already present at the baseline survey. This is reflected by the median incomes for the RMG being substantially above those seen in the inner or outer maintenance domains. Table 34 indicates that over 90% of RMG households received more in wages in the midline survey over the baseline survey; but that the median increase was only around 12,500 NPR, which was less than the suggested annual salary of approximately 45,000 NPR for an RMG member.[12]

2.2.3 Number of income sources

A total of 37 different income generating activities were asked about in the household survey, although some of these activities could have produced multiple income sources at the household level, for example if 2 different members of the household had waged jobs. The majority of households across the whole survey indicated between 1 and 4 different income sources within their household.

In the build areas there was almost no change in the number of different income sources identified within the RBG domain between the baseline and the midline. This contrasted with the inner and outer buffers where there was a significant decrease in the average number of income-generating activities from approximately 3 to approximately 2. The fact that the average for the RBG remained constant whilst other domains remained the same may indicate that generally there was a net reduction of 1 income source across the area, potentially as a result of drought. However, the RBG domains also added a new income source (RBG wages) which resulted in no overall change for this domain. This trend can be seen in Figure 46 by the summary of RBG participation regardless of domain, showing these changes in the income sources over time.

[12] The calculation is derived from the average 100 working days provided to RMG workers at an average of 450 NPR per day.

Figure 45: Number of income sources

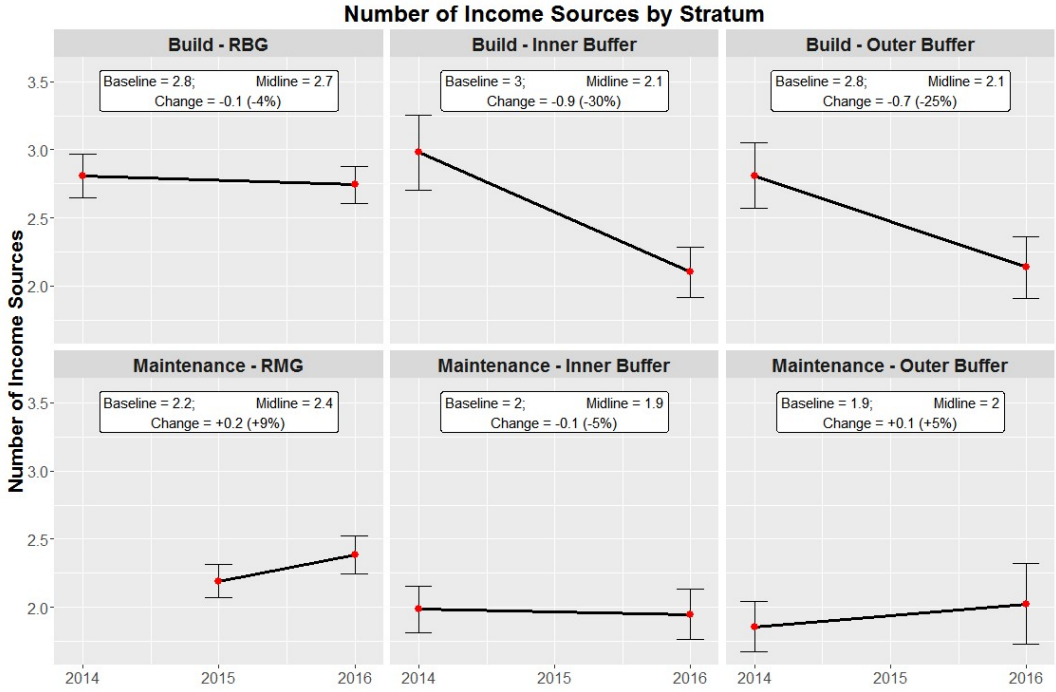
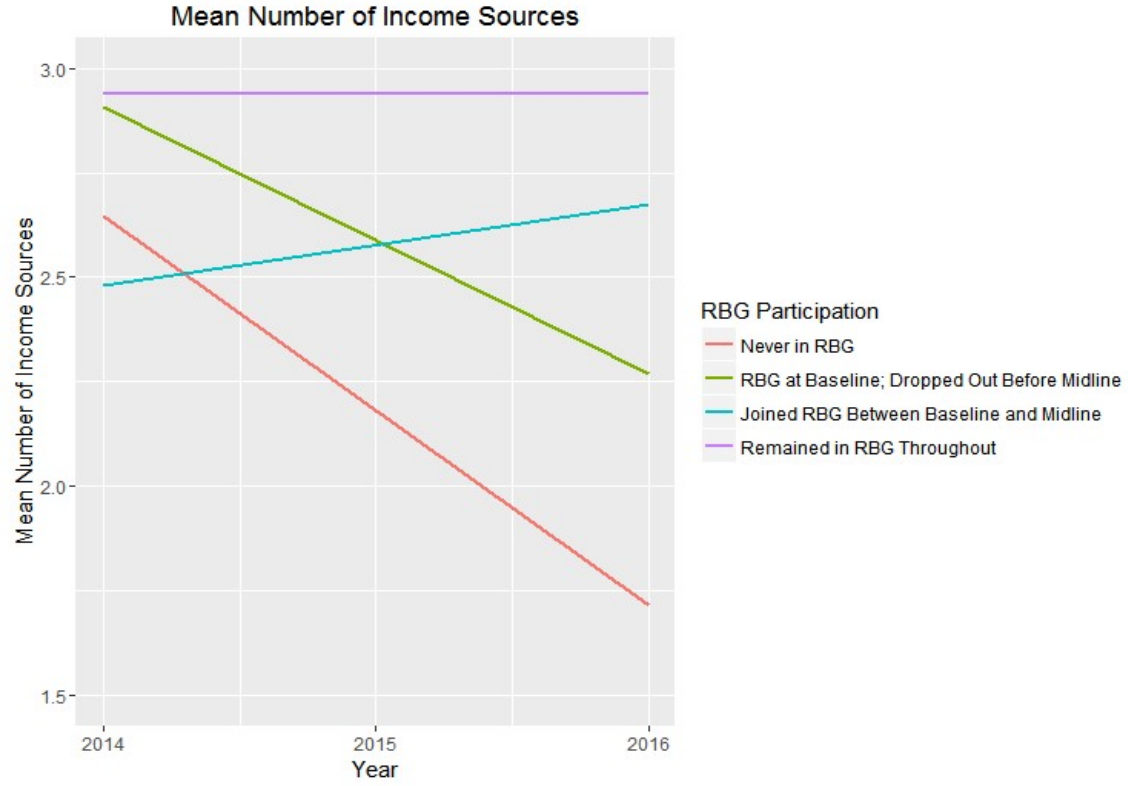


Figure 46: Mean number of income sources



In the maintenance area there was a small, but statistically significant (p=0.023) increase in the number of income sources within the RMG domain, whereas there was no significant change within the inner or outer buffers. The increase in the RMG domain cannot be attributed to RMG wages, because 100% of households in the RMG domain were already receiving some income from RAP wages at the baseline survey.

2.2.4 Contribution of income and income sources to households

Figure 47: % of total income by source by domain in build area

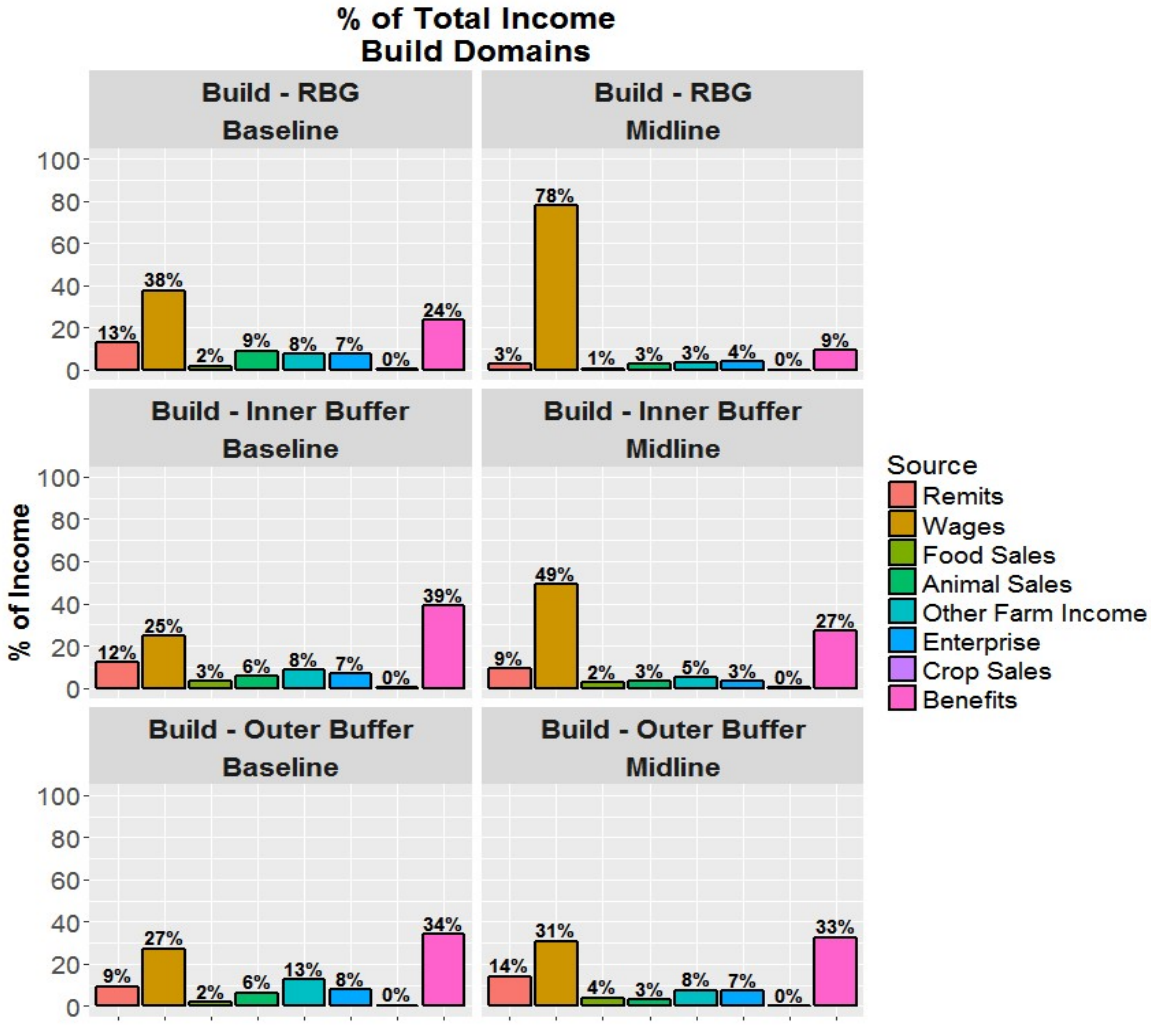


Figure 48: % of households receiving income from any source by domain in build area

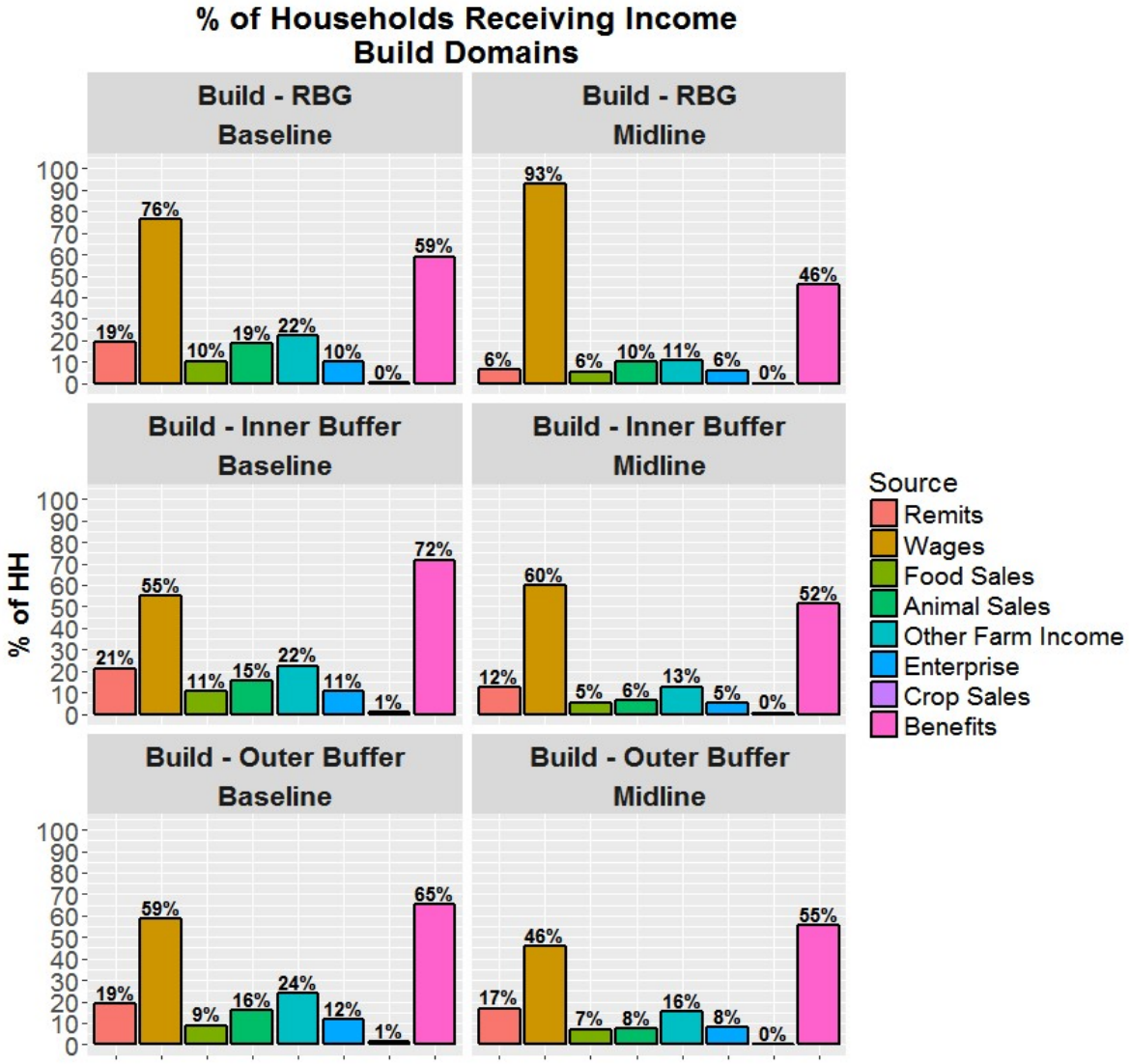


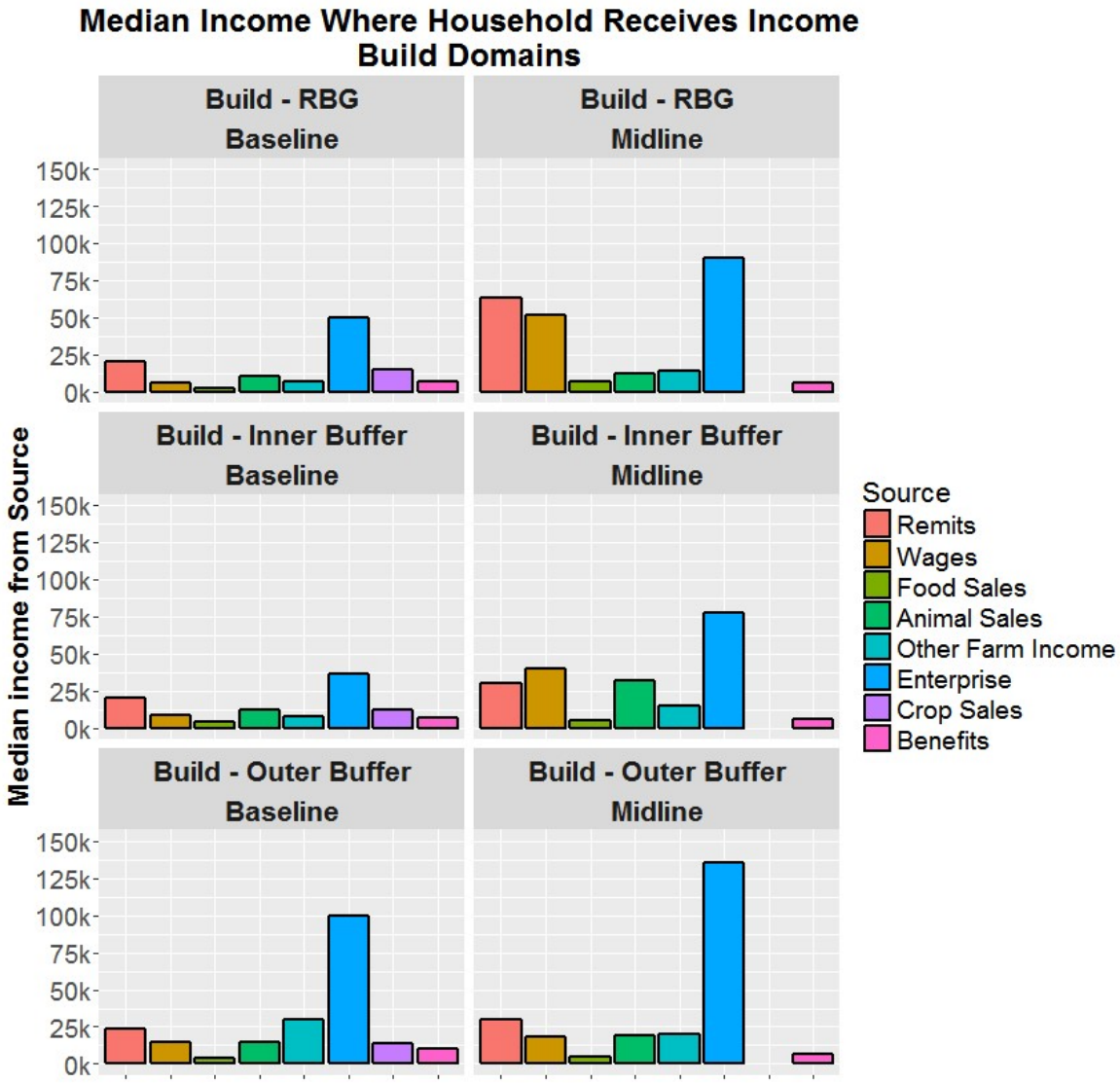
Figure 47 illustrates the percentage of total income which was attributed to each of the income source areas in the build domains over the two surveys. The percentage of income coming from wages dominated the midline income sources within the RBG domain, with 78% of the value of all income coming from wages. Wage income also became a larger component in the inner build domain, again largely as the result of many of these households being employed in the road building programme in the area. The contribution of the total income which was attributed to remittances dropped in the RBG to just 3%, from 13%.

Figure 48 illustrates that only 6% of RBG households recorded receiving any income from remittances at the midline, a substantial reduction from the 19% at the baseline. The proportion of households in the RBG receiving incomes from any non-wage category fell from the baseline to the midline.

Remittances made up a larger component of the outer buffer income at midline than at baseline, whilst proportional income from wages went up slightly and benefits remained at a similar proportion of the total. Figure 48 illustrates that the percentage of households receiving any income dropped between the baseline and midline in every category. There was a noticeable decrease in the proportion of income coming from the 'other farm income' category in the outer build area; this

category was dominated by the sale of herbal plants at the baseline survey. The RCA study found that people in build areas indicated that some workers who normally migrate for work in India had opted to stay home for a season of work on RAP roads in order to spend time with their families, accepting that their incomes would drop for this period. This could account for the increase in waged income and decrease in remittance noted in Figure 48.

Figure 49: The median income for source type where households receive income in that category



Just under 20% of households in the build outer buffer indicated selling some herbal plants at the baseline, with an average annual income from this source of 60,000 NPR among these households. At the midline only 10% of the outer buffer households indicated selling herbal plants within the past year with an average income of just 28,000 NPR among these households.

Figure 49 illustrates the changes in median income within each of the income sources among households who are receiving income from that source in the build domains. The average value of wages shows a substantial increase from the baseline in the RBG and inner buffer domains. Although Figure 47 and Figure 48 illustrate that enterprise is not conducted widely, Figure 49 illustrates that those households who are conducting private enterprises are successfully making large incomes on average relative to other income sources, and that these have increased over time. In Build areas the

RCA has found that a few entrepreneurs successfully take advantage of the period of road building by servicing workers and project staff. For example, some families in the RCA study were renting their rooms to project staff, providing haulage services for road materials and equipment and others have seized opportunities to establish small general shops, medicine shops and restaurants.

The average value of remittances in the RBG domain increased substantially from the baseline. Combined with the drop in households receiving remittances in the RBG domain, this suggests that many of the lower value remittance sources within this domain are no longer being continued.

Although large numbers of households receive income from Government benefits, the cash value of these benefits is low and remains largely unchanged from the baseline survey at an average of 6000 NPR per annum per household.

Figure 50: % of total income – maintenance domains

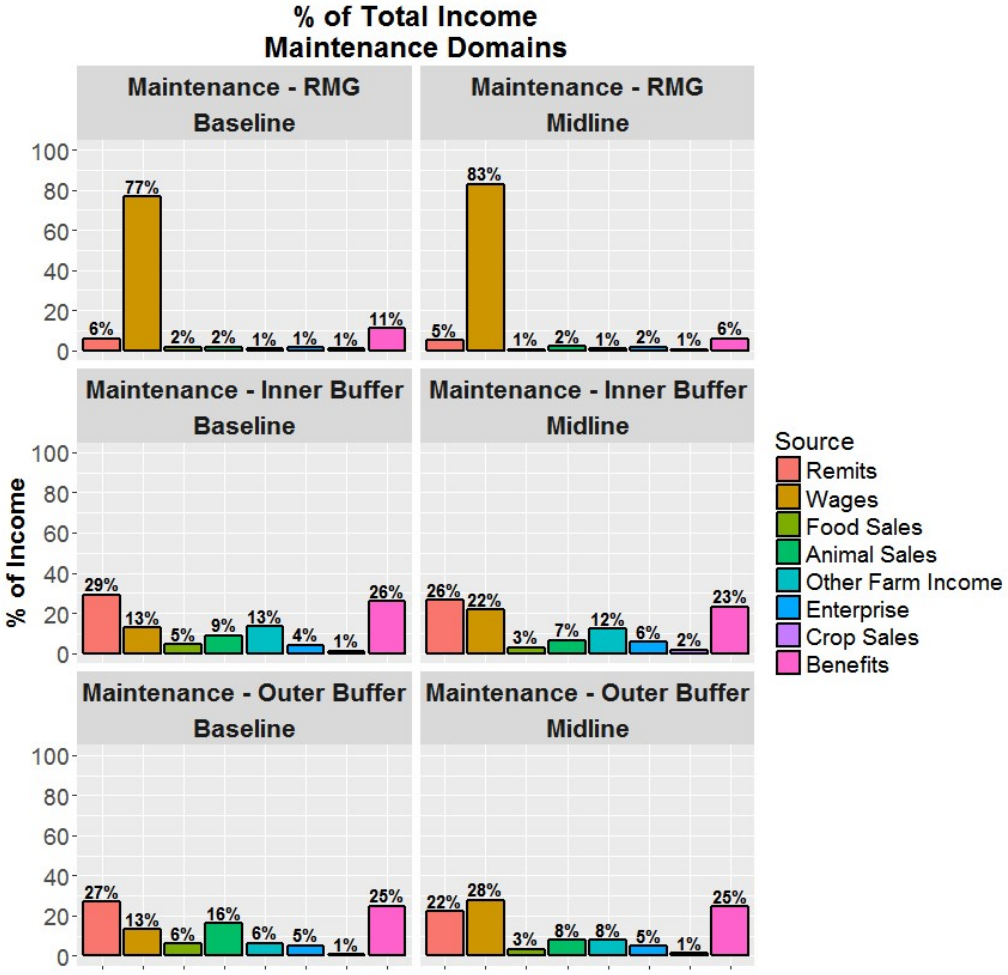


Figure 51: % of households receiving income – maintenance domains

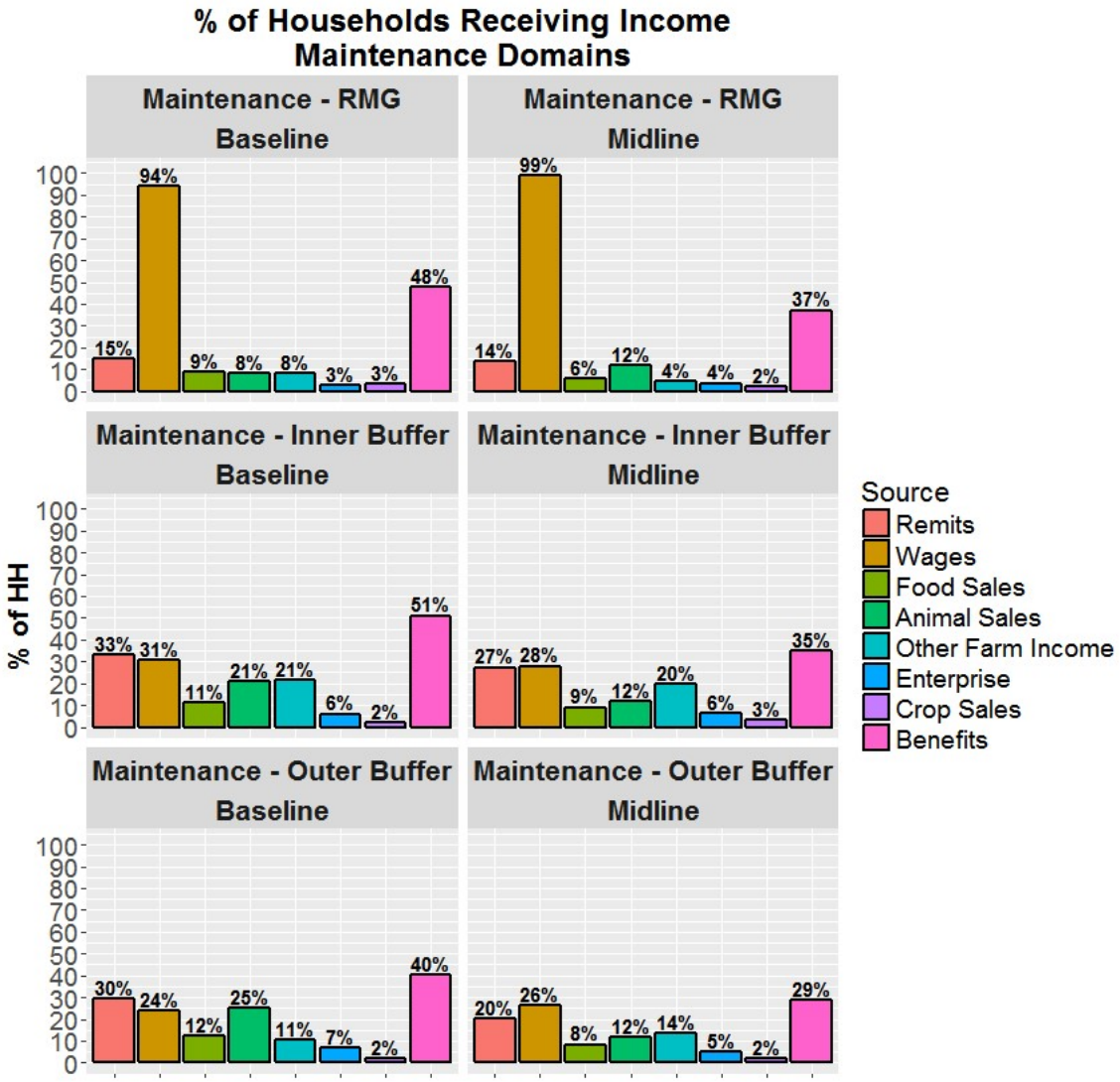


Figure 50 illustrates the percentage of total income which was attributed to each of the income source areas in the maintenance domains over the two surveys. The percentage of income coming from wages at the baseline survey dominates in the RMG member households, in sharp contrast with the maintenance inner buffer households, further illustrating the issues with the timing for the 2015 baseline for the RMG households. There were no major differences between the baseline and midline breakdown of income sources among the RMG households, a slight increase in the wage percentage and a slight decrease in the percentage coming from benefits.

The patterns in the income sources were reasonably consistent between the inner and outer maintenance domains and did not show large shifts between the two surveys. Among both domains the household income from remittances and benefits made up the largest component of the overall household income in the baseline survey and remained as a large component at the midline survey. The main differences between the two surveys was a decrease in the percentage of households receiving benefits and a decrease in the percentage of households selling animals. There were increases in the proportion of income coming from wages within both domains, but no major increases in the proportion of households receiving wages. This suggests an increase in the average wage paid within these regions.

Figure 52: Median income where household receives income – maintenance domains

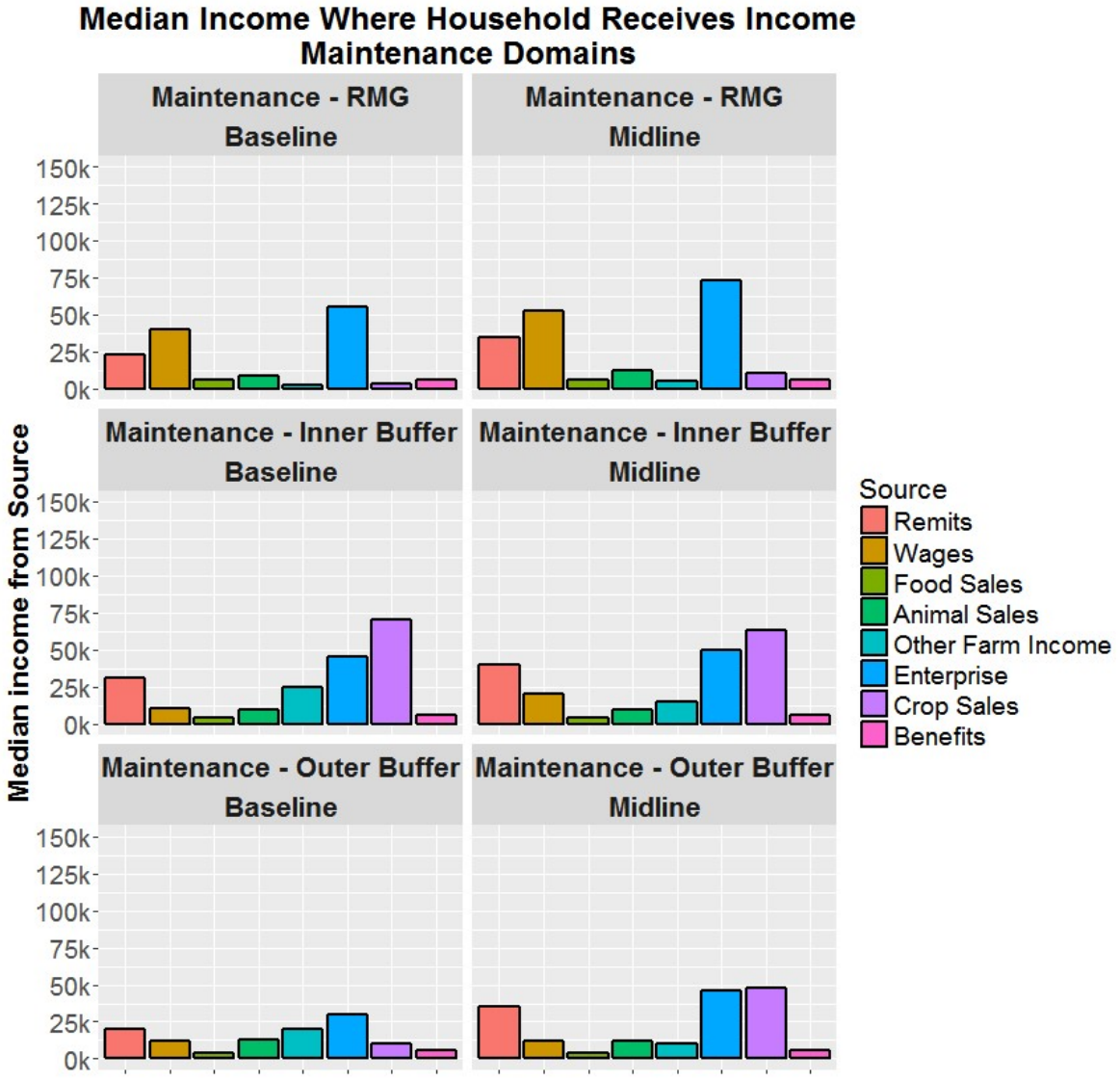


Figure 52 illustrates that private enterprises in the maintenance area do not receive as much income on average as in the build area, and that they did not see such large increases from the baseline survey. In the inner buffer, crop sales remained a higher value income source than enterprise, albeit one conducted by a smaller number of people. Remittances were also a reasonably lucrative source of income on average, and grew in value across all maintenance domains between the two surveys. The RCA study indicates that there is an increasing trend to migrate for waged work especially in view of the recent drought. RCA study indicates that people feel they can manage if they have at least one member of the family working abroad and this is an aspiration. Wage labour is important as the demands of an increasingly cash economy take effect but the overall contribution in build areas is less than remittance. It is more difficult to provide an explanation of the maintenance areas except that these represent areas of observable growth, market hubs that are thriving by people's accounts and researchers' observations. As such, construction work is readily available and provides wage-earning opportunities.

The RCA study found within its maintenance study locations a few entrepreneurs who were often described by others as 'persistent, hard-working self-starters' who have accessed serial support over the years from a variety of organisations. For example, '*one man in Achham had a vegetable nursery*

which he started more than a decade ago with help from GIZ and earns NPR 1.5 lakh per year. He said that others felt he did well because he was located close to the RAP road but he was glad others had not copied him, "If others had done this there would have been no market"… Another who was supported by RAP SED decide to grow chilli on 1 ropani of land he had previously devoted to wheat and rice and made NPR 1 lakh during the first year. But we also saw many abandoned poly-tunnels and those who grow tomatoes and chillies say it is just for their own consumptions. Most agree it is very difficult because of the shortage of water.' **(Midline RCA Report p. 19).** By and large people shared that very few entrepreneurial activities have been successful.

RCA case study: Benefits from increasing production

I met a man who keeps a general store beside the roads built by RAP. He has run this successfully now for five years and had built up a reputation for his home-made lemon syrup, which he has made for some time. Although he was not poor as the shop was doing well (and other villagers we met said he is one of the *'most wealthy in the village'*), he was selected by RAP 3 for further support because he is a Dalit and was known to the RAP staff who stayed near to his shop during the construction period. He was given training on seed collection and selling by an NGO which he could not name but knew it was supported by RAP. But most importantly he was given equipment for his lemon syrup production. *'I sold lemon syrup before but having the equipment has helped me enlarge the business.'* With the larger production he now trades in the main town as well as a number of local villages.

Field notes, Doti

2.3 Savings

At the midline, 72% of RBG households were participating in a savings group. This was substantially higher than the baseline within the RBG groups (40%) and the comparable population within the inner build domain (39%). The fact that the savings accounts in the RBG domain were not held by close to 100% of the sample suggests that not all RBG households are participating in the supposedly mandatory savings scheme. Fewer households in the outer buffer held savings at the midline than at the baseline, only 19% of households within this domain.

RMG household participation in savings groups was at a similar level in 2016 as at the 2015 baseline, around 50%. At the midline this was similar to the maintenance inner domain, who also had around 50% participating. However, the maintenance inner domain saw an 11 percentage point decrease in households who had participated in a savings group from baseline, which was an almost identical shift in savings group participation as in the outer maintenance group (Figure 53).

Figure 53: % household member of savings group

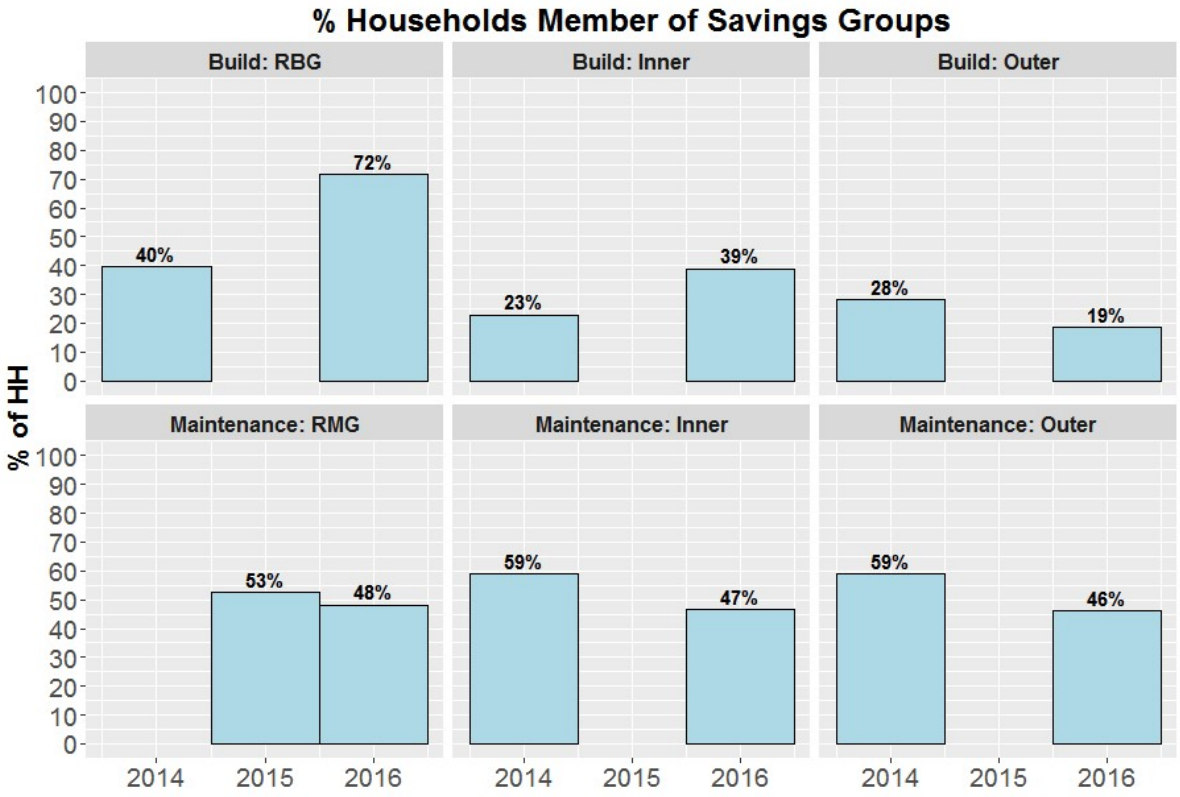
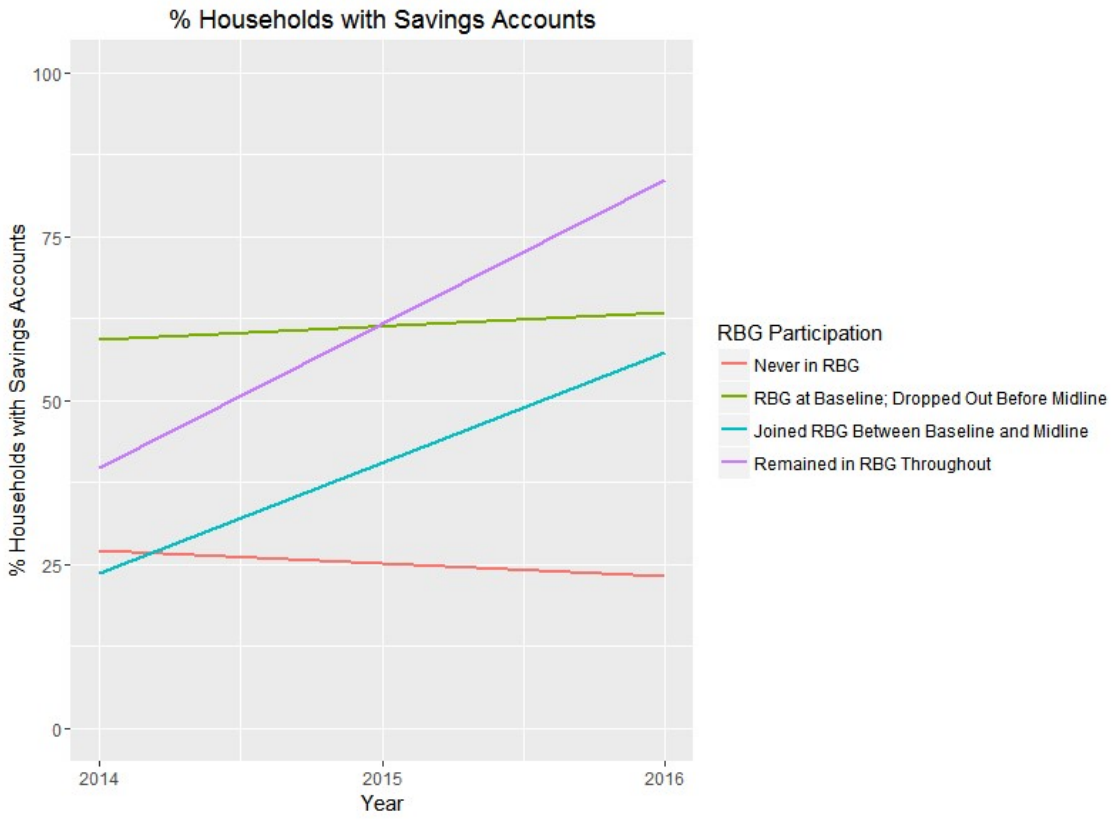


Figure 54: % household with savings accounts



The median value held in savings accounts did increase to up to a median of 9,515 NPR at the midline survey for the RBG group, whilst the inner build increased up to a median of 7,000 NPR. This not only shows that RBG households are more likely to have a savings account but if they do they are more likely to have saved more money than the comparable inner build group. Savings held within the outer buffer were generally low in value and did not increase between the baseline and midline.

There is no particular difference in the median amount saved between the RMG (3,800 NPR) and inner maintenance domain (3,600 NPR) but savings within these groups were substantially higher than the outer maintenance group (2,500 NPR) (Figure 55).

Figure 55: Median amount in savings account

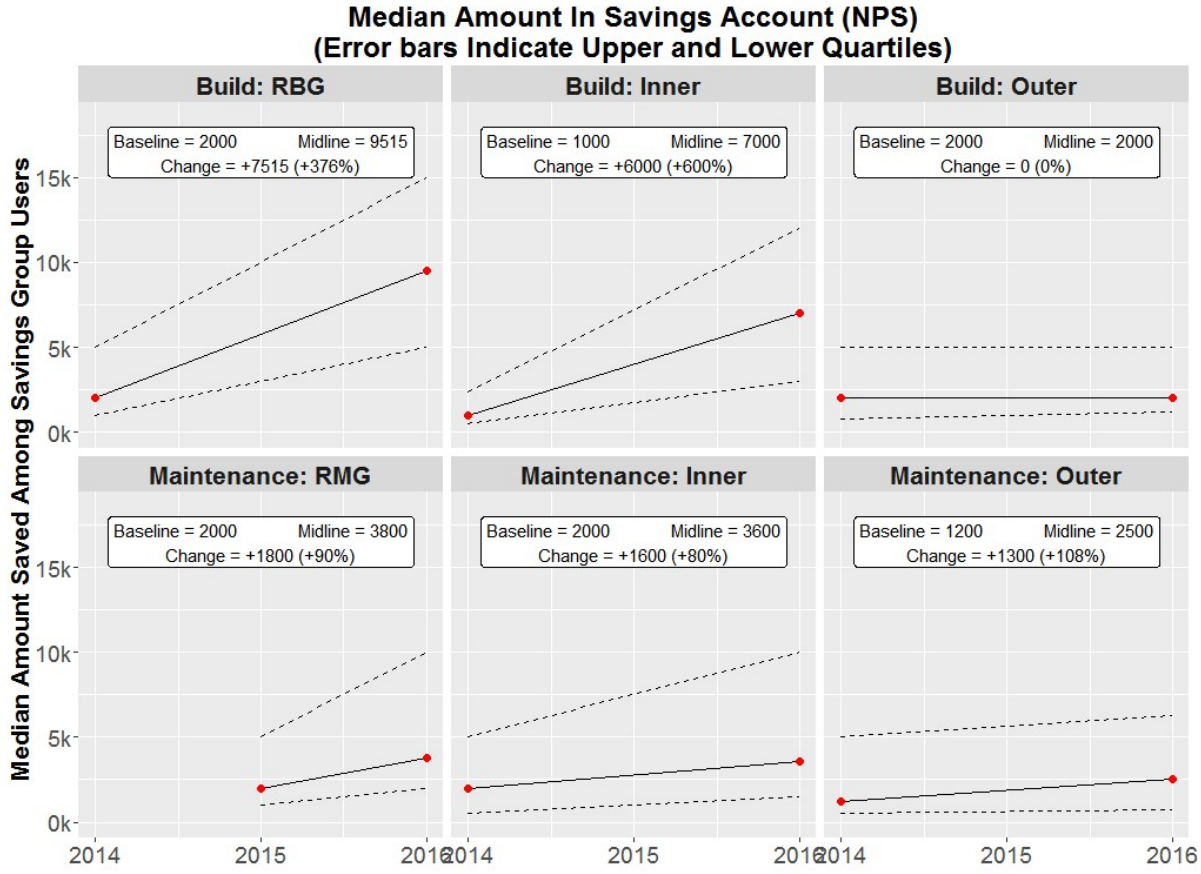
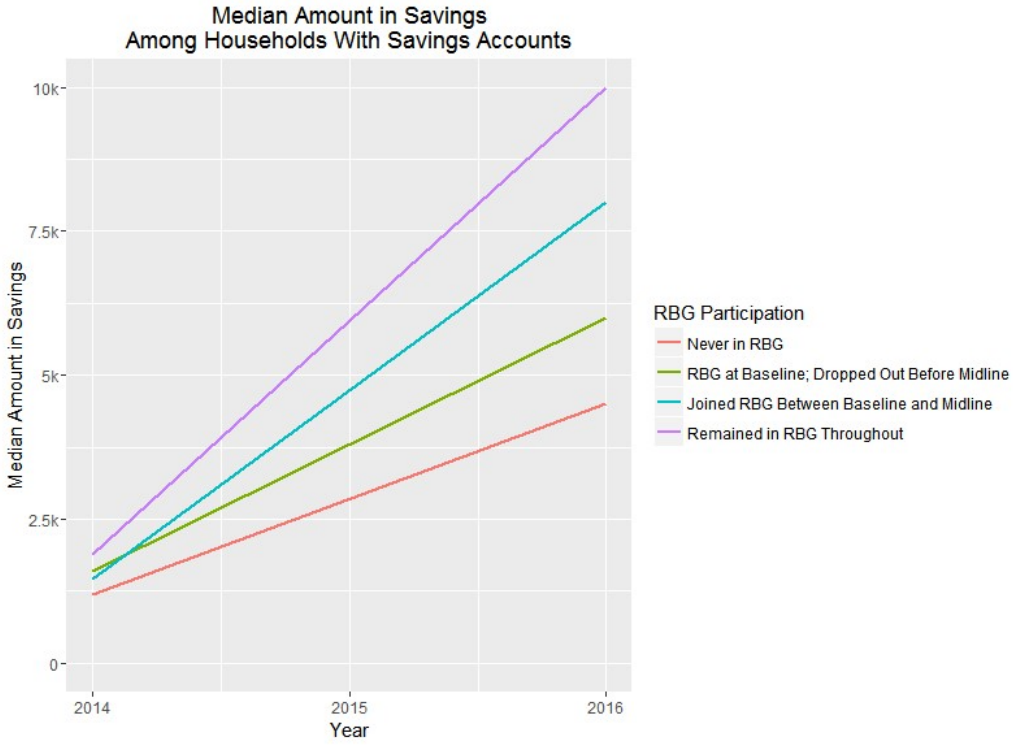


Figure 56: Median amount in savings among households with savings accounts



2.4 Human capital (health and education)

2.4.1 Illnesses

Households were asked about any minor illnesses or injuries that had occurred within the previous 30 days. Table 35 illustrates the percentage of minor illnesses within each domain which incurred monetary costs, through the purchase of medicine, transport or treatment/consultation fees.

This table illustrates that RBG households were more likely than inner or outer build households to pay to treat minor illnesses than inner or outer buffer households at the midline. The RBG group also showed a larger rise in the percentage of illnesses incurring monetary costs from baseline to midline. However, among RBG households the average spend per minor illness decreased from 825 NPR to 600 NPR between the surveys whereas the average spend per illness increased in the inner and outer build domain, particularly in the outer buffer. This decrease in spend was associated with a large increase in the use of shops to purchase medicine rather than obtaining treatment from a specific healthcare facility (e.g. pharmacy, health post, hospital, health worker) (Table 36).

Within the inner build areas at the midline survey the average cost of a minor illness or injury that was treated through a shop was 300 NPR, compared with 1000 NPR for a minor illness or injury treated at a specific healthcare facility. In the outer buffer of the build region the average cost per minor illness treated at a shop was 180 NPR compared with 1850 NPR for a minor illness treated at a healthcare facility.

This suggests that RBG households are more likely to spend money on illnesses that they would have previously ignored and can be treated cheaply, whereas other households are only spending money on illnesses which are more severe and thus more expensive to treat. Unlike 2014, the RCA researchers were often asked for medicines when they stayed with families this time and conversations around this implied that people had become more used to using medicines. It has been

noted before from RCA studies in Nepal that as soon as roads are under construction medicine shops are opened so that access and familiarity with medicines increases.

Interestingly, several RMG members shared that since members of their group had participated in RAP sponsored first aid training, they had become more aware of health issues and the remedies they could purchase with cash they did not have before.

Table 35: % of minor illnesses incurring treatment/medicine costs

Domain	% of Minor Illness Incurring Treatment/Medicine Costs	
	Baseline	Midline
Build: RBG	67%	77%
Build: Inner	59%	63%
Build: Outer	66%	63%
Maintenance: RMG	72%	83%
Maintenance: Inner	57%	65%
Maintenance: Outer	66%	63%

Table 36: Median spend on minor illness/injury and % of households obtaining medicine from shop

Domain	Median spend on a minor illness injury (NPR)		% obtaining medicine from shop for minor illness rather than specific health facility	
	Baseline	Midline	Baseline	Midline
Build: RBG	825	600	12%	34%
Build: Inner	500	600	19%	23%
Build Outer	675	1700	19%	15%
Maintenance: RMG	650	500	12%	13%
Maintenance Inner	500	600	14%	16%
Maintenance Outer	700	1200	13%	17%

The same pattern in spending on treatments over time was seen in the maintenance areas, with a slight decrease in the costs for the RMG households, a slight increase for the inner buffer households and a large increase in costs for the outer buffer. However, there was no strong link in the maintenance areas between the costs and the use of shops, as there was a small increase in the use of shops for all three domains and levels of use were similar. Shops were still considerably less expensive than healthcare facilities; in the inner areas the average cost at a shop was 460 rupees, compared with 900 rupees for a minor illness or injury treated at a specific healthcare facility.

2.4.2 Vaccinations

Table 37 shows the complete vaccination rates for 3- and 4-year-old children within each domain at the baseline and midline. Complete vaccination was defined as having received the vaccinations for measles and BCG and all three rounds of the vaccinations for Polio and Diphtheria/Hepatitis B.

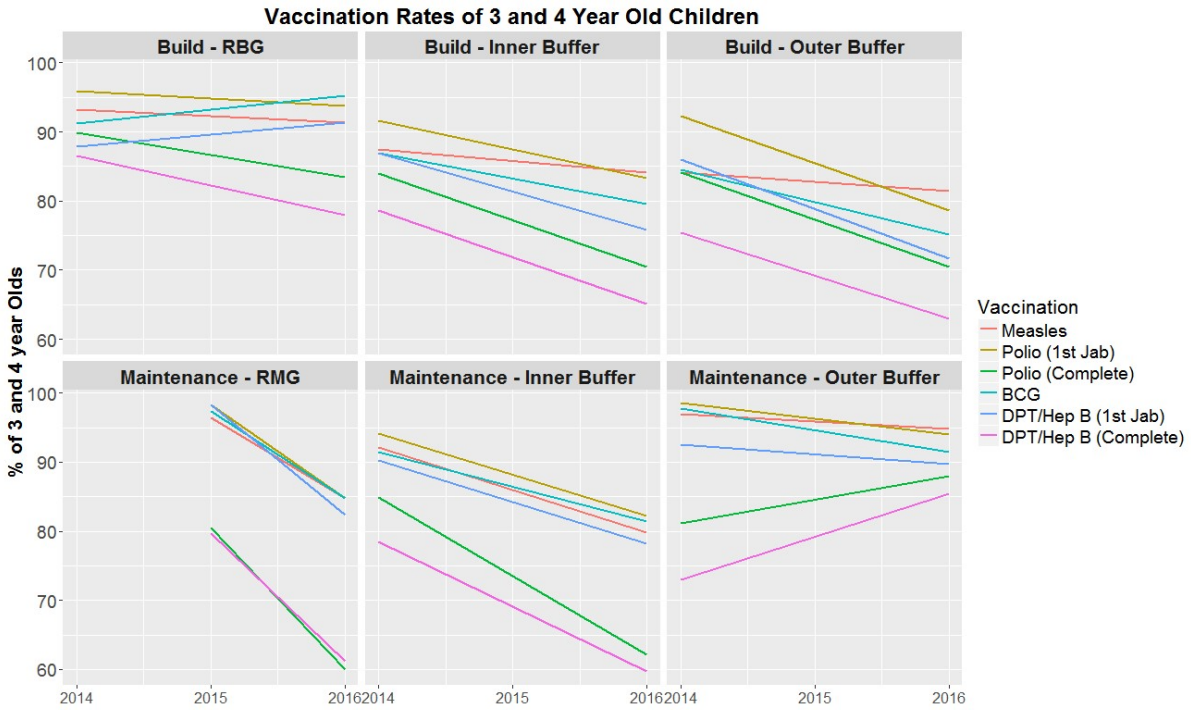
There was a reduction in complete vaccination rates in all three build domains, although the reduction was considerably lower for RBG household children (–8%) compared with the inner (–15%) and outer buffer domains (–13%). Figure 57 shows the changes within the specific vaccinations over time. This illustrates that within the RBG group vaccination rates for BCG and the initial vaccine for DPT/Hep B went up between the two surveys. This increase was not seen in the inner or outer buffers of the build area. The overall reduction for the RBG households in vaccination was due to decreases in the percentage of children completing all three rounds of the polio and DPT/Hep B. In the build inner and outer buffers all of the individual vaccines had lower completion rates in 2016 than 2014.

In the maintenance areas the midline results for the RMG and inner buffer children were almost identical, with only 55% of children in these domains receiving all vaccines. Figure 57 shows a consistent drop in the completion rates of all vaccines for these areas. The maintenance outer buffer areas saw a large increase in vaccination rates between the surveys. Although there were slight reductions in the completion rates for the vaccines administered to children when they were younger (measles, BCG, initial jabs for polio and DPT/Hep B) there were large increases in the proportion of children in this region who had completed all three rounds of the polio and DPT/Hep B vaccinations.

Table 37: % of 3- and 4-year-olds with complete course of vaccination

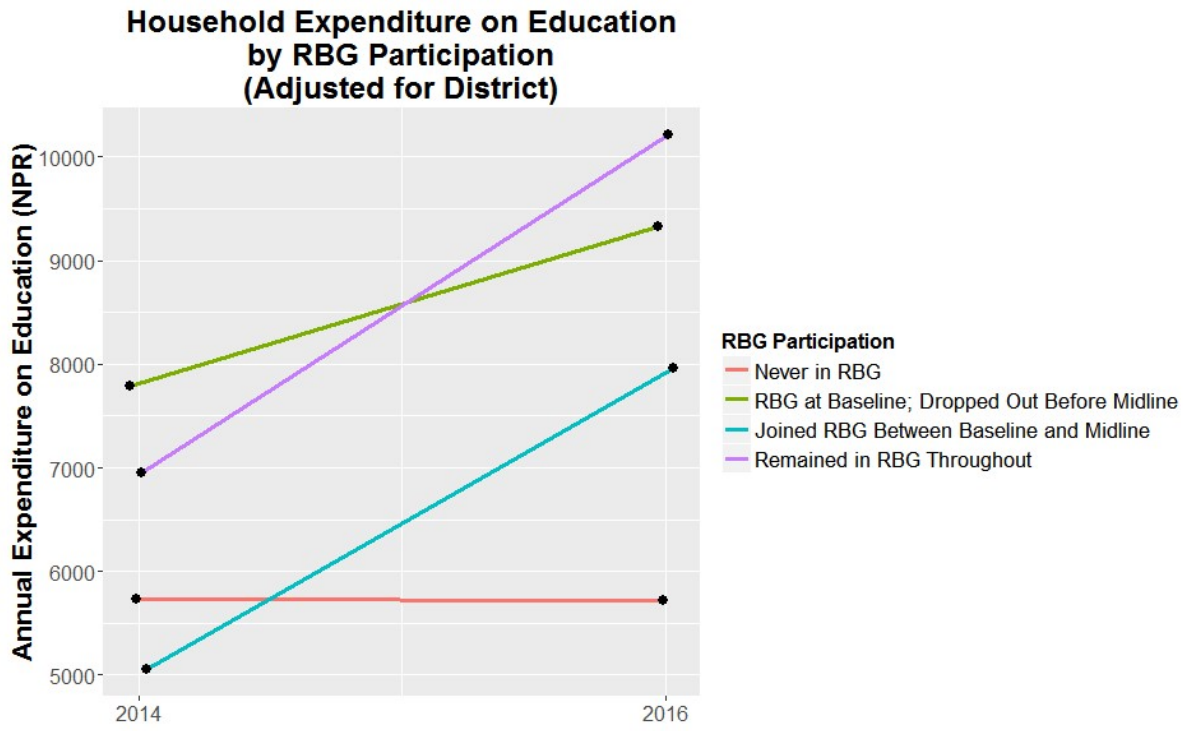
Domain	% of 3- and 4-year-olds with complete course of vaccination	
	Baseline	Midline
Build: RBG	84%	76%
Build: Inner	76%	61%
Build: Outer	71%	58%
Maintenance: RMG	78%	55%
Maintenance: Inner	76%	55%
Maintenance: Outer	71%	85%

Figure 57: Vaccination rates of 3- and 4-year-old children



2.4.3 Education

Figure 58: Household expenditure on education by RBG participation

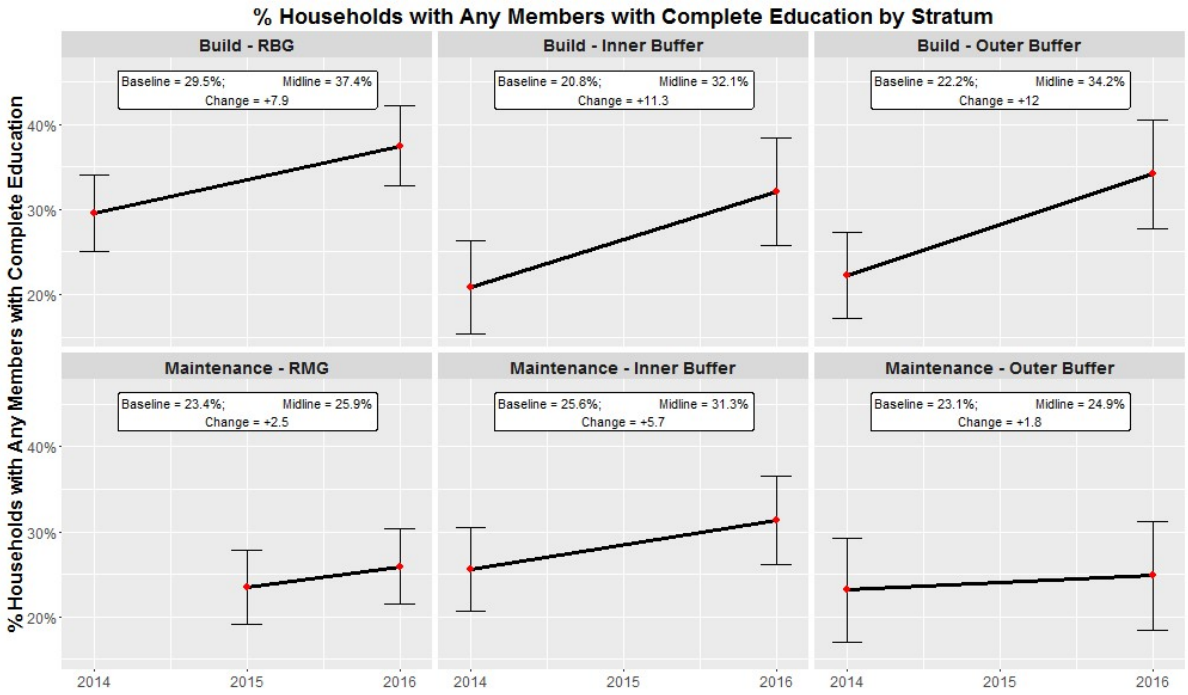


There was strong evidence to suggest that households in the build region who had participated in the RBG spent significantly more money on education at the midline survey than households who had not participated in the RBG. This combined with there being no evidence of a significant difference between these groups at baseline, and a significant 'difference-in-difference' effect, suggests that RBG households increased their spending on education more so than households not participating.

There was no evidence of a 'leaving' effect in educational spending between households staying in the RBG and households leaving the RBG.

There was evidence of a 'joining' effect. Although there was no significant difference at the midline between households joining the RBG and households never joining the RBG there was a significant difference-in-difference effect suggesting a larger increase over baseline for the households joining the RBG.

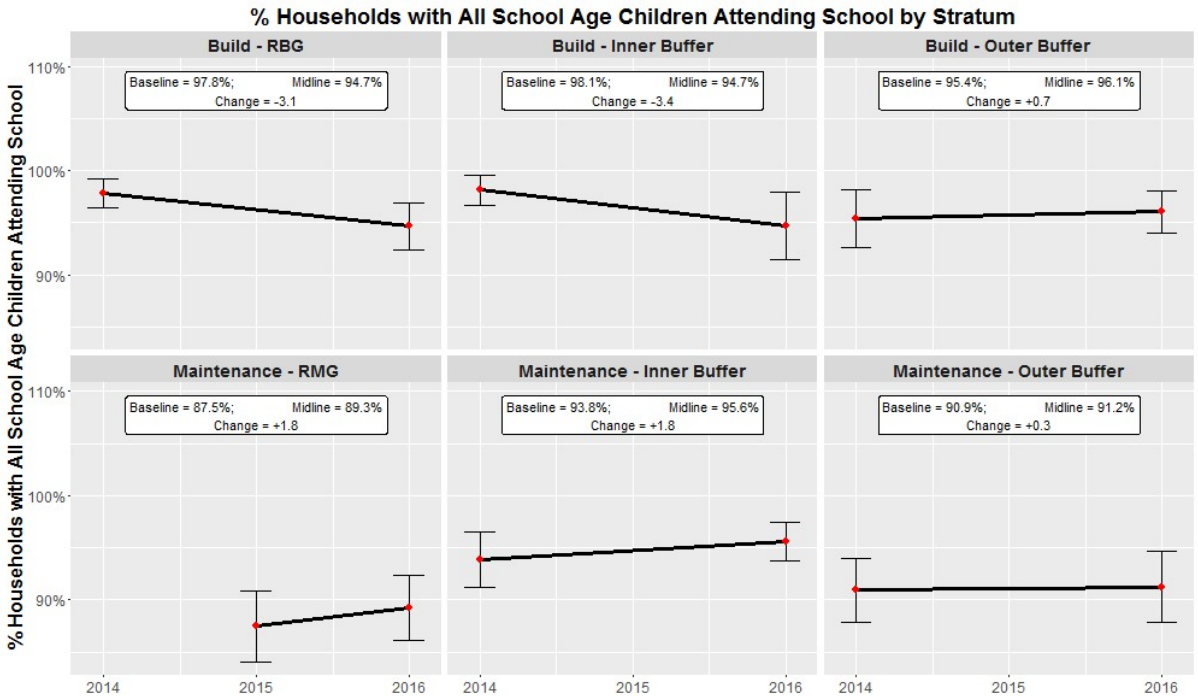
Figure 59: % households with any members with complete education



The percentage of households containing at least one member who had a complete secondary education increased across all six domains. This increase was particularly apparent in the build areas where there was an increase from 21% to 32% in the inner buffer and an increase from 22% to 34% in the outer buffer. The increase in educated households is largely the result of children graduating from school with a complete education and remaining within their communities (Figure 59). This is reflected by the reduction in the average age of a person with complete education; in the baseline this was 29 years and in the midline it was down to 23 years.

The RCA noted that parents have very high motivations for their children to attend school, leave farming and '*do better than we have done*'. As mentioned in Part 1, Section 1.6, education costs are one of the biggest drains on household budgets especially transitioning from primary to secondary school. Families who feel worse off than they did in 2014 frequently put this down to education costs, especially as the quality of schooling in villages is seen as poor compared with towns, so children have to go away to school, incurring transport and accommodation costs. Youth were more likely to share their intentions to pursue higher education than they had done in 2014.

Figure 60: % households with all school-age children attending school

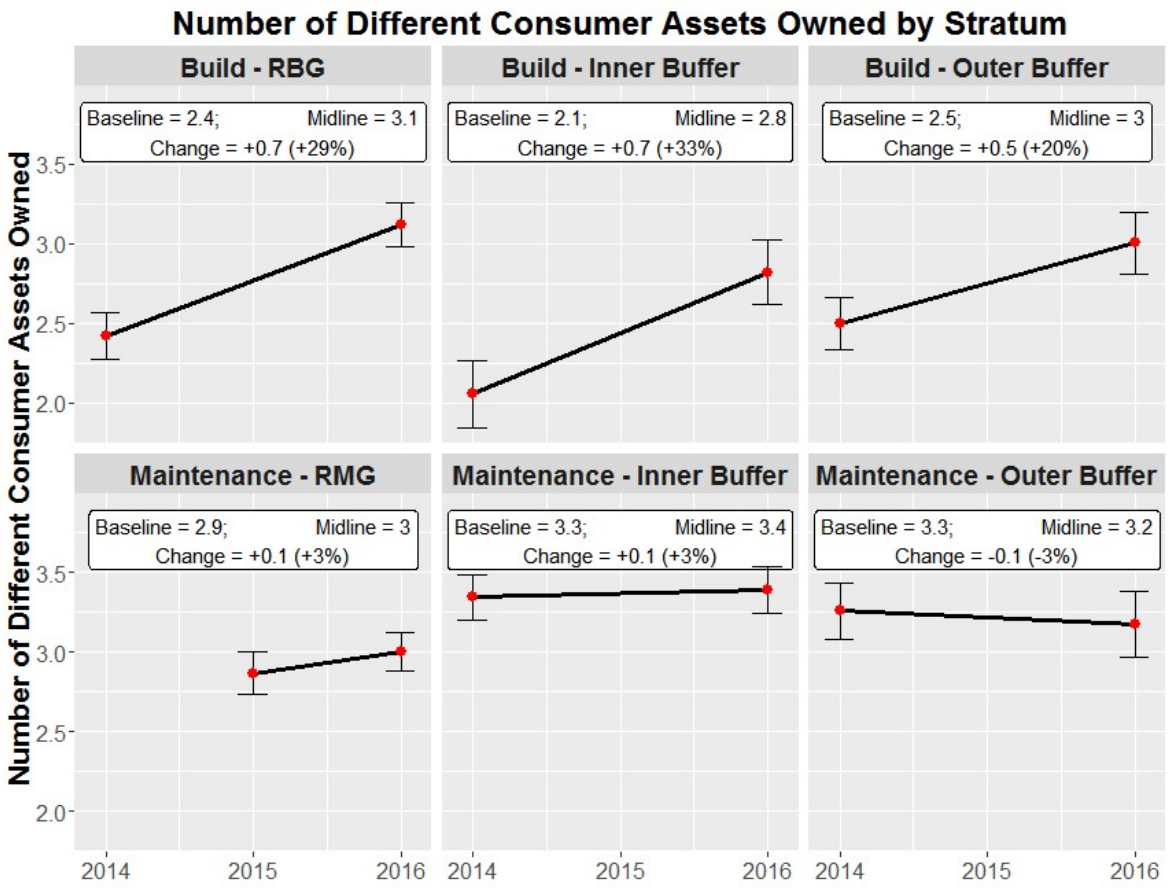


There were reductions in the % of households where all school-age children attended school in the build RBG and build inner domains from 98% to 95%. This reduction was statistically significant when taking all data from within these two domains (p=0.006). School attendance remained at similar levels in the other four reporting domains between the two surveys. RMG households remained less likely to have all school-age children in school when compared with all other domains, although they did see a slight increase between the two surveys.

2.5 Physical assets (assets and land)

2.5.1 Consumer assets

Figure 61: Number of different consumer assets owned



Consumer asset ownership significantly increased in all of the build domains. There is no evidence of a RAP effect in the change in asset ownership comparisons between RBG vs inner buffer (p=0.915). Table 38 suggests that the increase in the asset index was due to increases in the percentage of households owning any furniture, solar power generators, mobile phones and jewellery. Ownership of all of these assets increased in all of the build areas domains.

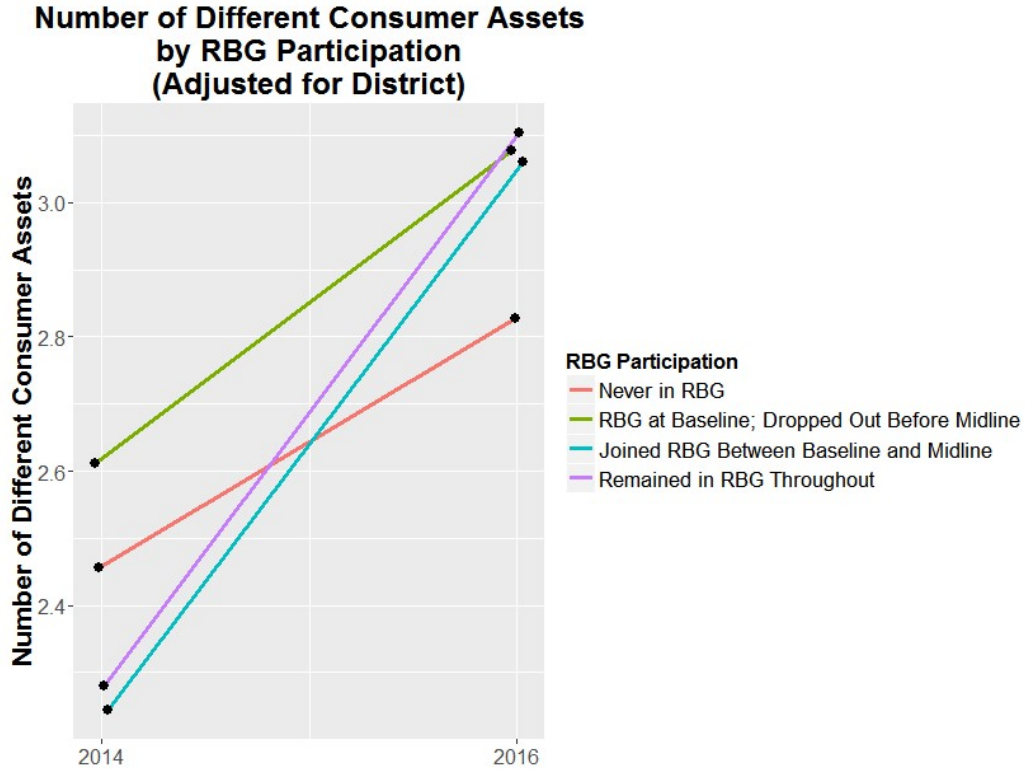
Table 38: Change in consumer asset ownership (build districts)

Asset	RBG		Build Inner		Build Outer	
	Baseline	Midline	Baseline	Midline	Baseline	Midline
Radio	31%	33%	26%	22%	31%	23%
Bicycle	0%	0%	0%	0%	0%	0%
Motorbike	0%	0%	0%	0%	0%	0%
Heaters	1%	1%	0%	0%	0%	0%
TV	6%	7%	2%	2%	3%	4%
Pressure Lamps	0%	0%	0%	0%	0%	0%
Solar	38%	46%	47%	56%	50%	61%
Landline Phone	0%	1%	0%	0%	1%	1%

Asset	RBG		Build Inner		Build Outer	
	Baseline	Midline	Baseline	Midline	Baseline	Midline
Mobile Phone	56%	76%	46%	68%	54%	76%
Sewing Machine	1%	2%	1%	3%	3%	3%
Furniture	36%	63%	31%	58%	41%	62%
Jewellery	74%	84%	68%	83%	75%	81%

The average number of different consumer assets owned did not vary significantly between the baseline and midline for any of the maintenance domains. Table 38 indicates that there were some changes in ownerships of the individual assets. Within the RMG domain, ownership of jewellery, solar generators and radios increased slightly between the surveys. Similar changes in asset ownership were seen in the inner and outer maintenance domains with increased ownership of solar generators and mobile phones and a decreased ownership of jewellery and furniture.

Figure 62: Number of different consumer assets by RBG participation



Investigating the differences between levels of RBG participation shows that the increase in consumer assets was greatest for households remaining in the RBG or joining the RBG after the baseline survey. The rate of increase for the households dropping out of the RBG was lower than these two groups, but they started from a significantly higher level at baseline. All three of these groups who participated in the RBG at some point had no difference between the average number of consumer assets at midline.

Table 39: Change in consumer asset ownership (maintenance districts)

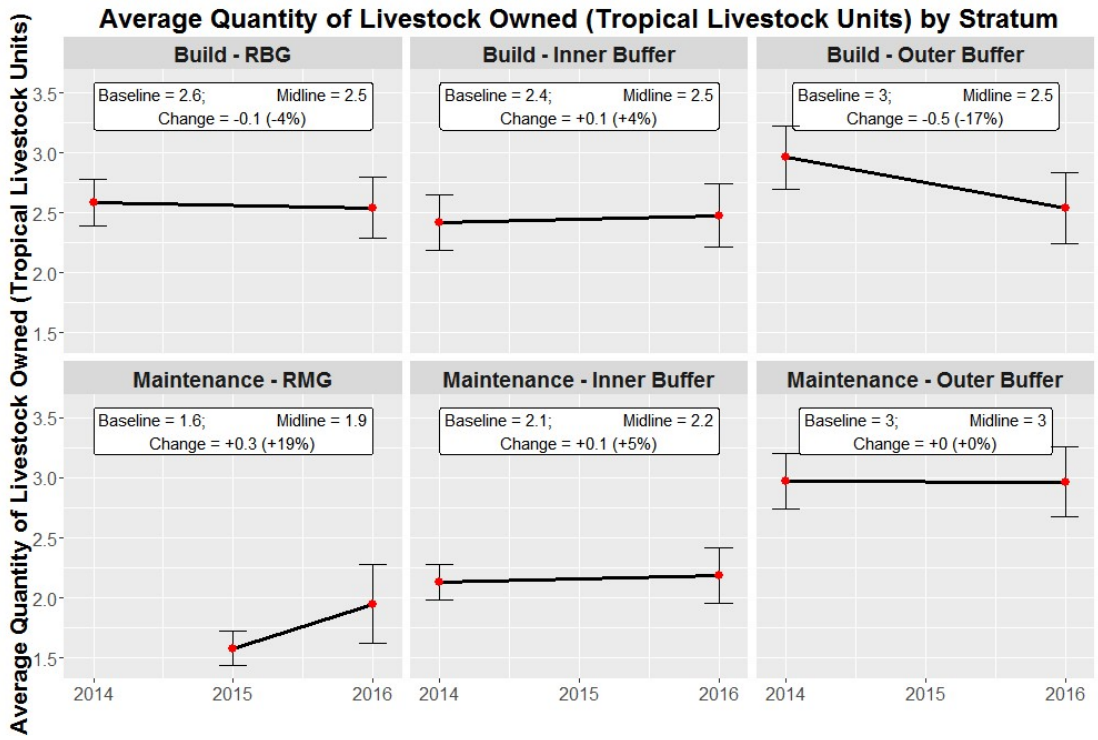
Asset	RMG		Maintenance Inner		Maintenance Outer	
	Baseline	Midline	Baseline	Midline	Baseline	Midline
Radio	23%	27%	35%	36%	40%	38%
Bicycle	0%	0%	1%	0%	0%	0%
Motorbike	0%	0%	0%	0%	0%	0%
Heaters	0%	1%	0%	0%	0%	1%
TV	5%	5%	8%	10%	2%	2%
Pressure Lamps	0%	0%	0%	0%	0%	0%
Solar	36%	42%	49%	55%	64%	72%
Landline Phone	1%	0%	1%	1%	0%	0%
Mobile Phone	84%	85%	76%	80%	65%	78%
Sewing Machine	3%	3%	3%	3%	1%	4%
Furniture	58%	56%	62%	56%	59%	41%
Jewellery	76%	81%	89%	81%	91%	77%

Furniture ownership was much higher in the maintenance areas at the time of the baseline survey relative to the build areas, around 60% for maintenance and 35% for build. The proportion of households owning furniture increased substantially in both build domains but decreased slightly in the maintenance domains, around 60% for both.

Jewellery ownership in the inner maintenance domain decreased from the baseline survey, whereas it slightly increased for the RMG group. This perhaps indicates that some members within this population were forced to sell assets held to secure income, where the RMG wages provided an income sources meaning this was not necessary.

2.5.2 Productive assets

Figure 63: Average quantity of livestock owned



There was no change in approximate average combined value of a household's livestock (tropical livestock units – TLU)[13] for the RBG or build inner households. Both of these domains had an average TLU value of 2.5 at the midline survey. In the calculation of the TLU different animals are assigned different weightings – 1 cow, horse or yak is equal to 0.7, 1 sheep or goat is equal to 0.1 and 1 chicken (or other poultry) is equal to 0.01. There was a reduction in the value for the outer build buffer – at the baseline survey the outer build had a higher TLU than the RBG or inner buffer domains, but at the midline there was no difference between them.

The three most common animals owned within this region of Nepal are cows, goats and poultry. Around 5% of households did record owning sheep, with a similar number owning horses whilst only very small numbers of households recording owning any other form of livestock. There is a noticeable geographical trend to owning horses: 25% of households in Jumla; 13% in Humla; 13% in Mugu; and close to zero everywhere else.

Table 40 shows the changes in the ownership of the three main categories of livestock within the build domains. In the RBG domain there was a small increase in the average number of goats owned; houses owning goats owned an average of 1 more than they had at the baseline survey. This trend was almost identical within the build inner buffer domain. There was no change in the percentages of households owning each of the animal types for the RBG and inner domains. There were reductions in the average number of cows, goats and poultry owned per households as well as reductions in the number of households owning these animals within the outer buffer. The difference was particularly large for goats – at the baseline survey goat-owning outer buffer households owned an average of 2 goats more than inner buffer households whereas the at the baseline survey there was no difference between these two domains.

Table 40: Change in ownership of livestock (build districts)

		% Households Owning Animal		Average Size of Herd Among Owners	
	Animal	Baseline	Midline	Baseline	Midline
Build - RMG	Cows	75%	78%	2.5	2.9
	Goats	53%	59%	4.3	5.2
	Poultry	20%	27%	4.6	7.1
Build - Inner Buffer	Cows	88%	83%	3.1	3.2
	Goats	54%	57%	5.3	5.4
	Poultry	36%	44%	5.0	5.0
Build - Outer Buffer	Cows	86%	84%	3.5	3.5
	Goats	70%	68%	7.6	7.9
	Poultry	42%	55%	4.3	4.8

RMG households increased the value of their livestock in TLU between the baseline of 2015 and the midline. The baseline survey indicated that the TLU value of the RMG households was significantly lower than the maintenance inner buffer households. There were no significant changes in livestock value in the inner or outer buffer, although the outer buffer remained highly significantly higher than either of the other two maintenance domains.

[13] The classification of Tropical Livestock Unit (TLU) in Nepal is a method used for combining different livestock into a single figure for a herd. (For example, a household with 3 cows and 1 chicken has a larger herd compared with someone with 4 chickens.) This gives an idea of the total size of the herd before then breaking down into each different animal.

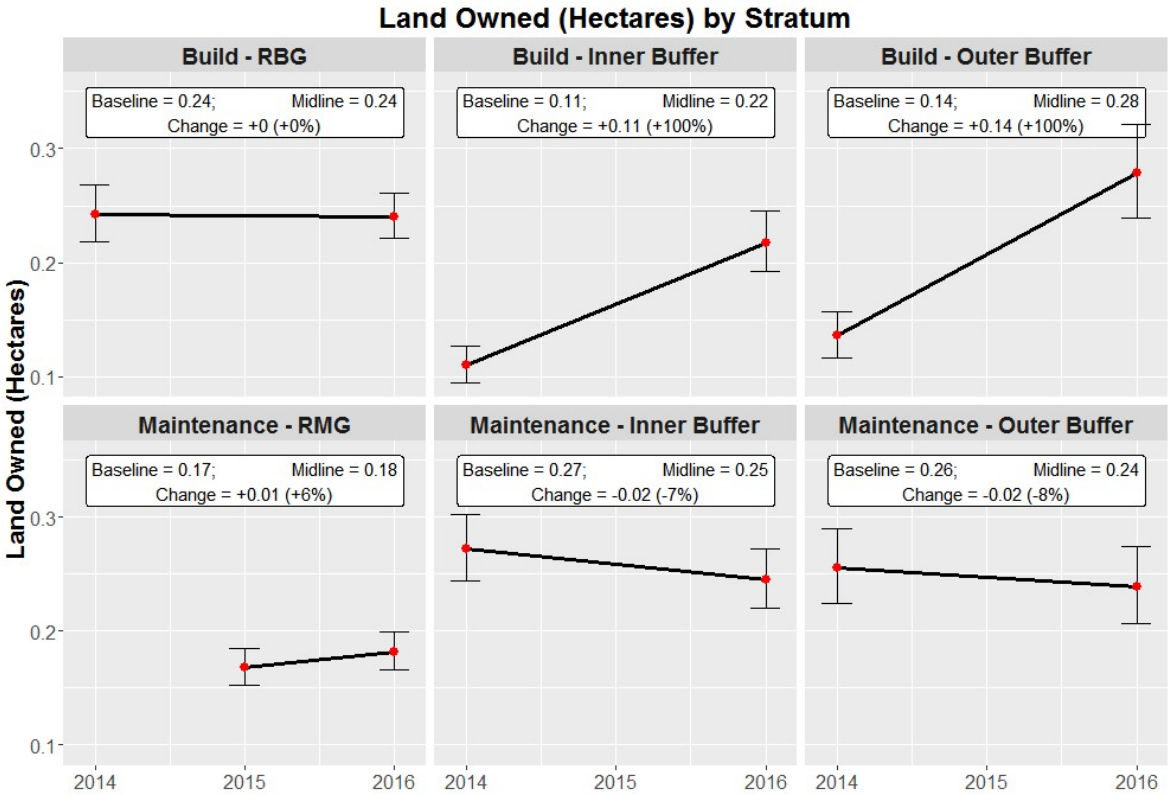
Table 41 indicates that more RMG households owned more cows, goats and poultry at the midline survey than did at the baseline survey and the average number of animals owned also increased. This was particularly apparent for poultry where the average number of poultry owned at midline was 7.1, an increase from 4.6 at baseline. Within the inner and outer buffers, the only major shifts in the livestock ownership between the two surveys was an increase in the proportion of households owning any poultry, which was a common trend to all maintenance domains.

Table 41: Change in ownership of livestock (maintenance districts)

		% Households Owning Animal		Average Size of Herd Among Owners	
	Animal	Baseline	Midline	Baseline	Midline
Maintenance - RMG	Cows	75%	78%	2.5	2.9
	Goats	53%	59%	4.3	5.2
	Poultry	20%	27%	4.6	7.1
Maintenance - Inner Buffer	Cows	88%	83%	3.1	3.2
	Goats	54%	57%	5.3	5.4
	Poultry	36%	44%	5.0	5.0
Maintenance - Outer Buffer	Cows	86%	84%	3.5	3.5
	Goats	70%	68%	7.6	7.9
	Poultry	42%	55%	4.3	4.8

2.5.3 Land and household facilities

Figure 64: Land owned



The average area of land owned among RBG member households did not change between the two surveys. There were, however, substantial increases in the average area of land owned among the

inner and outer build domains. At the baseline survey these two domains had recorded owning significantly less than the RBG domain, but at the midline there was no difference between the average area of land owned across these three domains.

RMG households owned less land on average than the inner and outer buffer of the maintenance domain. There was a slight increase in the average area of land owned within the RMG group from the 2015 RMG baseline, and there were small non-significant decreases in the inner and outer buffers of the maintenance domain. However, the area of land owned for RMG households was still significantly lower than the inner maintenance domain at the midline.

2.5.4 Housing

Figure 65: % households with iron or concrete roof

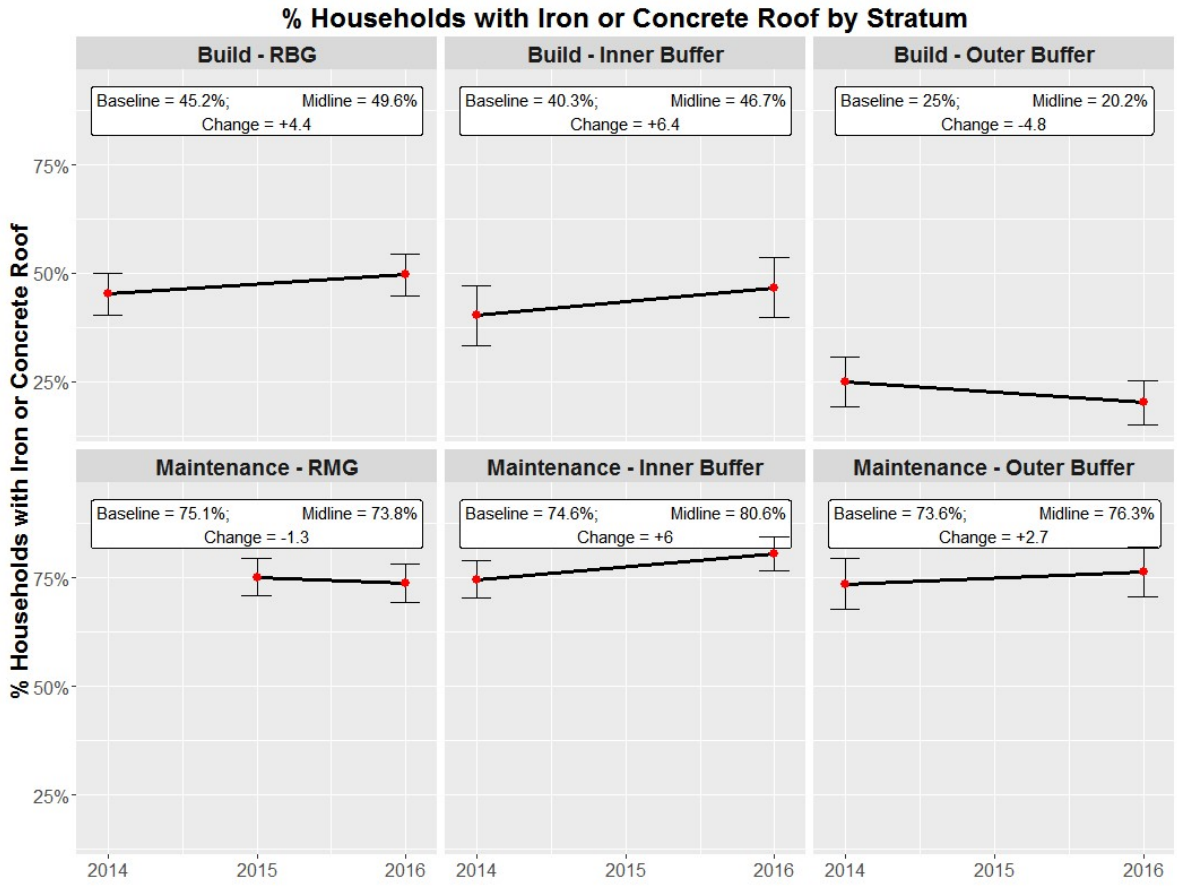
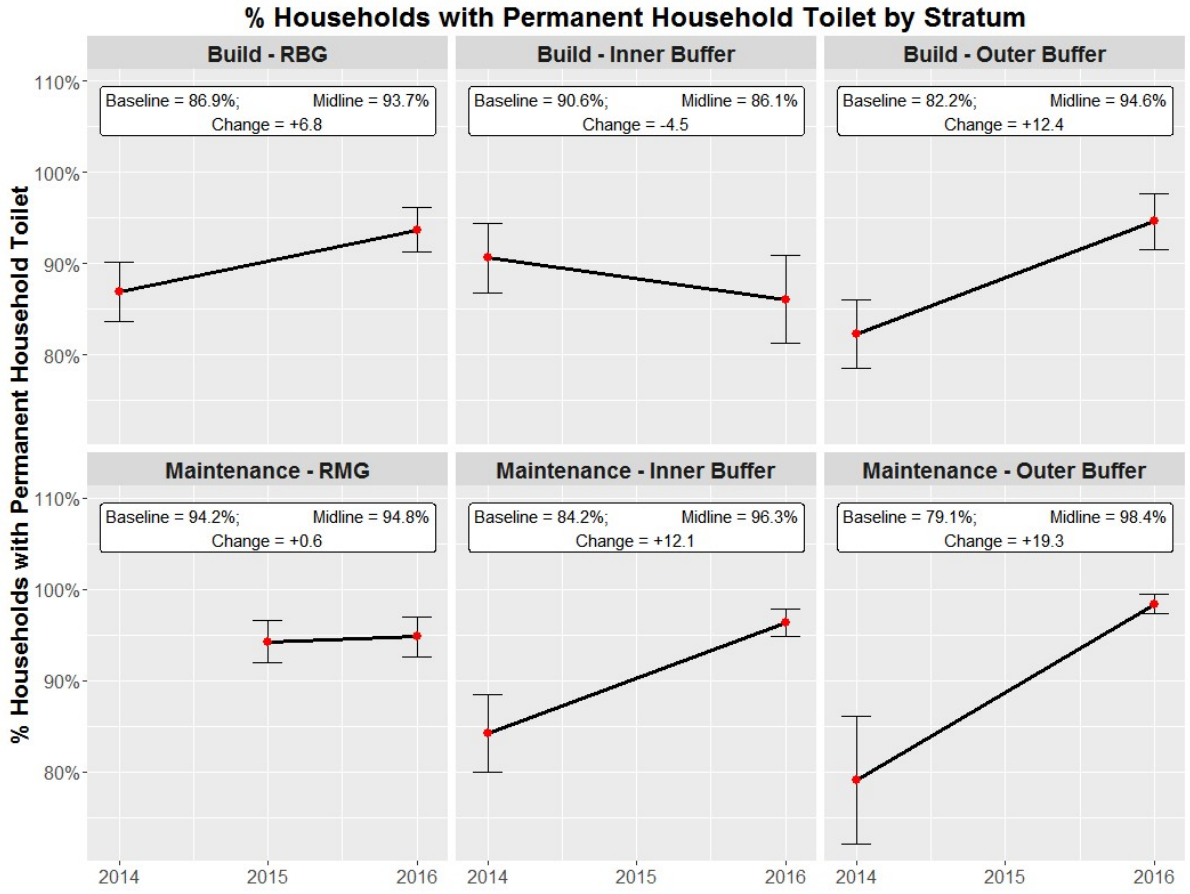


Figure 66: % households with permanent household toilet

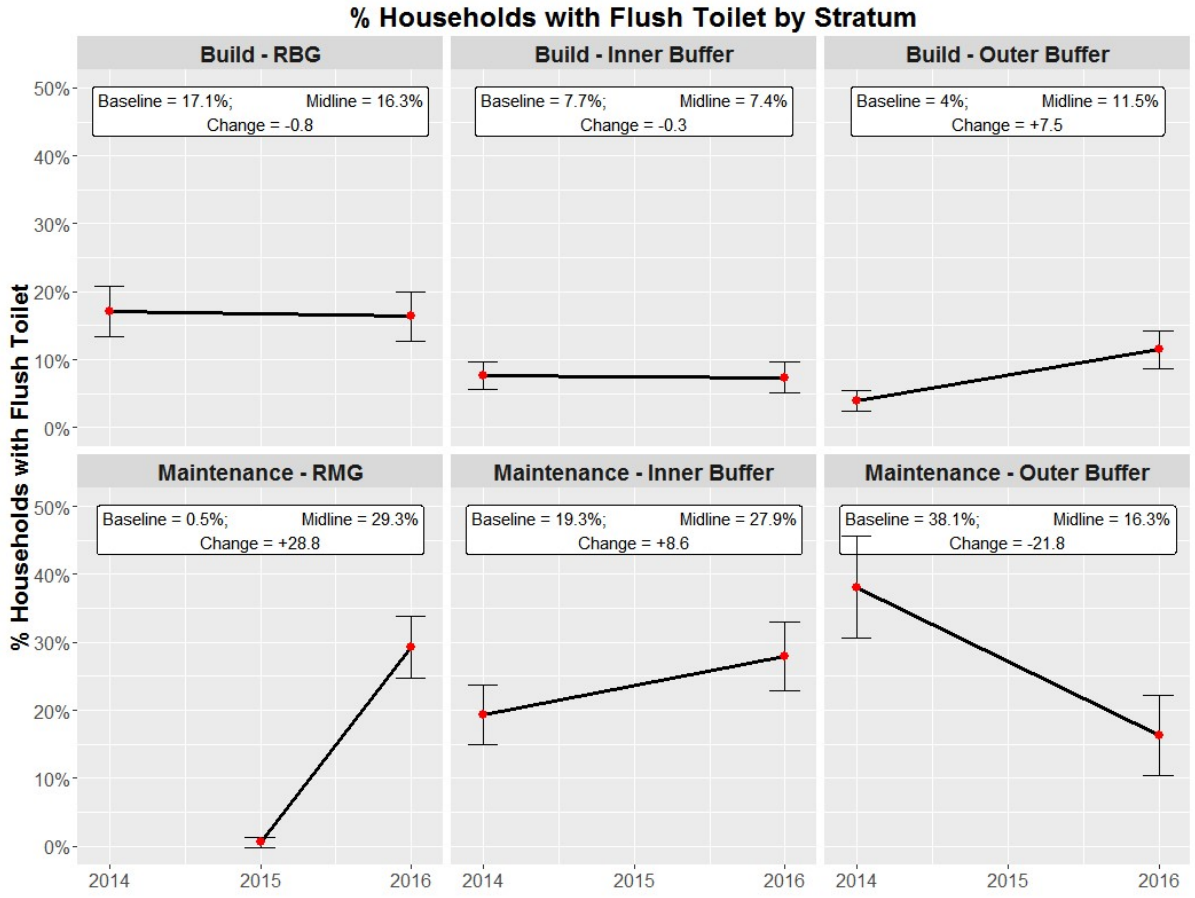


RBG households were more likely than inner buffer households to have moved from using shared or temporary toilet facilities to using a permanent non-shared toilet facility between the baseline and midline. At the midline 94% of RBG households had a private toilet facility compared with 86% of build inner buffer households. In the maintenance areas, close to 100% of households in all three domains had private household toilet facilities at the midline. This represented a large increase over the 2014 baseline results in the inner and outer buffer domains.

From the RCA study the researchers observed that a major difference in Doti from 2014 was the construction of toilets[14] with every household now having one. People told the study team they were threatened with fines if they did not build them. In Humla, the Village Development Committee (VDCs) have declared the study villages as Open Defecation Free (ODF) since 2015. Therefore whilst there may be an increase in toilets generally this may not entirely reflect either people's own choices to build these nor reflect the actual use of the newly constructed toilets.

[14] Researcher observations: although every house now has its own toilet, use is less consistent with much open defecation still in evidence.

Figure 67: % households with flush toilet



There were no changes in having a flush toilet in the RBG and inner build households between the baseline and the midline. However, at both surveys, there were significantly more RBG member households with flush toilets than inner buffer households. There was an increase of flush toilet ownership in the build outer buffer households from 4% in 2014 to 12% in 2016.

There was a huge increase in the percentage of RMG households using flush toilet facilities between the baseline and midline surveys. Less than 1% of RMG households indicated using a flush toilet at the 2015 baseline, and this increased to around 29% at the midline.

Part 3: Access to Services

This section of the report looks at 'access' from a few different perspectives. Access here means the use of roads (RAP and in general) as well as access to a number of different services. This is broken down by education and health services, and other economic services. The focus of this section is largely (although not exclusively) on the maintenance districts. Given that the road network is more mature in these districts and the fact that roads are still under construction in the build districts, it makes sense to see how maintenance activities have led to any noticeable improvements in road use and services around these roads.

Summary of Part 3:

Roads and transport use (see 3.1)

- Frequency of use of all roads has increased in maintenance areas, particularly for those living closer to the roads.
- The highest use of roads is in Achham.
- The majority of people perceive that RAP maintenance works has led to improvements in road conditions.
- The average fare paid for journeys increased significantly for journeys taking longer than one day, where the median fare paid at least doubled between 2014 and 2016. Prices for shorter journeys (<5 hours) remained similar in most areas.

Access to social services (see 3.2)

- There was no change in accessibility to schools, health posts or VDC HQs. However there was an overall perception that the quality of these services has increased, although varied by domains..
- Health posts were used more frequently at the midline than the baseline, across both inner and outer domains. The percentages of households 'never' using health posts reduced in the maintenance areas from 10% to 6% in the inner area and from 12% to 2% in the outer area.
- There is a strong preference for medicine shops over Government health posts.

Access to economic services (see 3.3)

- There was no change in accessibility to local shop, agrovets and agricultural centres.
- There was a slight increase in the perceived quality of the local shops. At the 2016 survey 25% in the inner maintenance area rated the quality of the shop as 'good', up from 16% in 2014, whilst in the outer areas 20% rated the shops as good, up from 13% in 2014.
- There was an increase in the use of agricultural centres.

Local enterprises and economic activity (see 3.4)

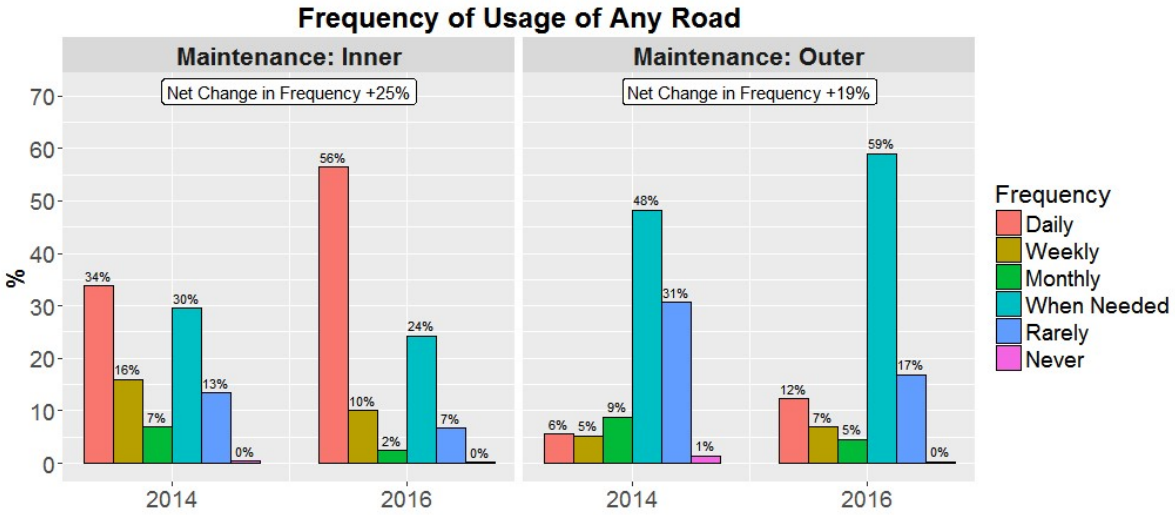
- The total number of households in the survey running private enterprises reduced dramatically between the 2014 baseline and the 2016 midline in the build districts, and stayed relatively consistent in the maintenance districts.
- However, there was a large turnover in households running enterprises. In the maintenance region and in the inner build region the majority of households running enterprises in 2016 were not running enterprises in 2014. In all domains the majority of households who were running enterprises in 2014 were not running enterprises in 2016.

3.1 Roads and transport use

3.1.1 Frequency of road use

Road use increased substantially in the maintenance region between the 2014 baseline and the 2016 midline, particularly among those living within the areas closest to the roads. Over 50% of respondents in the 'inner' domain indicated that they used roads on a daily basis, an increase from 34% at baseline. In the 'outer' domain of the maintenance region there was also a slight increase in road use with more respondents indicating that they used the roads 'when needed' and fewer respondents indicating that the roads were only used 'rarely' or 'never' (Figure 68).

Figure 68: Frequency of use of any road



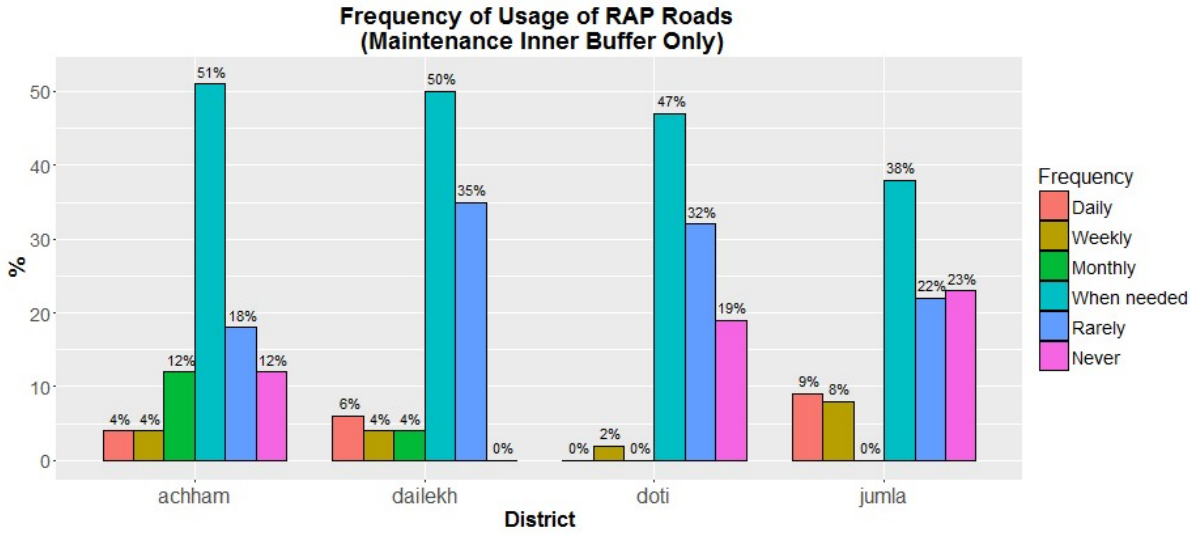
As part of the enumeration process respondents were informed of which roads within 20km of their home were the RAP maintained roads. When asked to consider only these roads, the majority of respondents within the maintenance inner domain indicated that they only used the RAP roads 'when needed' or 'rarely', with very few respondents indicating that the RAP roads were used on a reliable regular basis. There were some differences across the districts of the maintenance zone in these responses. Usage was highest overall in Achham, where only 30% indicated that they 'rarely' or 'never' used the RAP road and 20% of respondents indicated that they used the RAP road at least once a month. In Dailekh, no respondents indicated that they 'never' use the roads, although 35% did indicate that they only 'rarely' use the RAP roads. Both Doti and Jumla contained high percentages of respondents indicating that they 'never' used the roads: 19% in Doti and 23% in Jumla. However, Jumla also contained a comparatively large percentage of respondents using the roads regularly: 9% every day and a further 8% at least once a week. In contrast, no respondents in Doti indicated daily usage of the roads and only 2% indicated they used the roads at least once a week (Figure 69).

The RCA study indicates that people often continue to use old familiar trails rather than the RAP roads in maintenance areas as these are considered quicker for walking. Use of roads is confined to times when transportation is required, for example for carrying loads that are too big for walking with or for people unable to walk. People complained that the unpredictable frequency and timing of passenger transport as well as uncertainty of fare charges precludes greater use of transport and the roads. The study also noted that the usability of some roads is sub-optimal, because key infrastructure is missing (e.g. bridges) and therefore alternative routes are quicker as the case study indicates.

RCA case study: RAP road in Doti

Drivers and local people told us that vehicles do not use the lower part of the RAP road as it is longer by about 3km than an alternative through the forest. The longer road means higher fuel costs and even though part of the alternative road is very steep and means the vehicle has to be in first gear, it is still cheaper to use than the RAP road. We decided to drive down the largely unused portion of the RAP road to experience it for ourselves. It was in better condition than in 2014 and the driver suggested this was because it is rarely used. People came out of their houses to see the vehicle as it is now so rare for a vehicle to ply this route. We saw not a single vehicle on the way down. People in this area told us that if they need transport, they have to reserve a vehicle by phone as there are no regular transport providers on this stretch and it costs them 1800–2000 NPR to hire a vehicle. The only time this stretch is used is during heavy rains in the monsoon when the alternative route becomes impassable. But the drivers told us this is only for a few days per year.

Figure 69: Frequency of use of RAP roads



3.1.2 Perception of road quality

When asked if they felt the RAP road maintenance group activities were improving the road quality, the majority of respondents in the inner buffer thought that the RMG impact on the roads was positive. This was particularly strong in Dailekh and Jumla where over 96% of those who expressed an opinion felt that the quality of the road had improved. When asked specifically about the monsoon season, and whether the roads were operational during this season the results were more mixed. Just over a third of respondents who were able to answer in both Jumla and Achham indicated that the nearest RAP maintained roads were not passable. This was slightly lower in Doti (20% of respondents) but in Dailekh respondents overwhelmingly indicated that the roads were passable (94%) (Table 42). Examining the data further, there were 3 villages in particular where all respondents indicated that there were issues with the roads in the monsoon season – Bhalu Lagna, Himri Patan and Kholigaun. All of these villages are in Jumla, but they are all connected to different parts of the road network.

Table 42: Perceptions of road improvement

	Achham	Dailekh	Doti	Jumla
Has the provision of Road Maintenance Groups led to the improvement of overall condition of the road?				
Don't Know	*31%*	*18%*	*20%*	*30%*
Of those with opinion:				
Yes	*76%*	*96%*	*86%*	*98%*
No	*24%*	*4%*	*14%*	*2%*
Did the public vehicles operate in the RAP3 maintained roads during the last monsoon season?				
Don't Know	*29%*	*23%*	*27%*	*30%*
Of those with opinion:				
Yes	*63%*	*94%*	*81%*	*66%*
No	*37%*	*6%*	*19%*	*34%*

When asked to consider the impact that the RAP maintenance roads had had on various aspects of the community since their construction during the RAP2 phase, the respondents in the inner maintenance domain generally indicated that they believed the roads had made a positive impact. In particular, respondents indicated that they believed the roads had allowed more people to access healthcare (78%) and educational facilities (75%) and that the roads had generally improved the livelihood of the people within the community (73%). Although there was general agreement that the roads had improved the environment to start businesses in the community (68%) there was a fairly low level of agreement towards people actually starting businesses within the next two years (33%).

Opinions were mixed as to whether the roads had impacted migration, with roughly the same amount of people indicating that migration (both permanent and temporary) had increased as indicating that migration had decreased.

Respondents overwhelmingly rejected the idea that the roads had resulted in an increase in crime; only 15% agreed whilst 68% disagreed (Table 43).

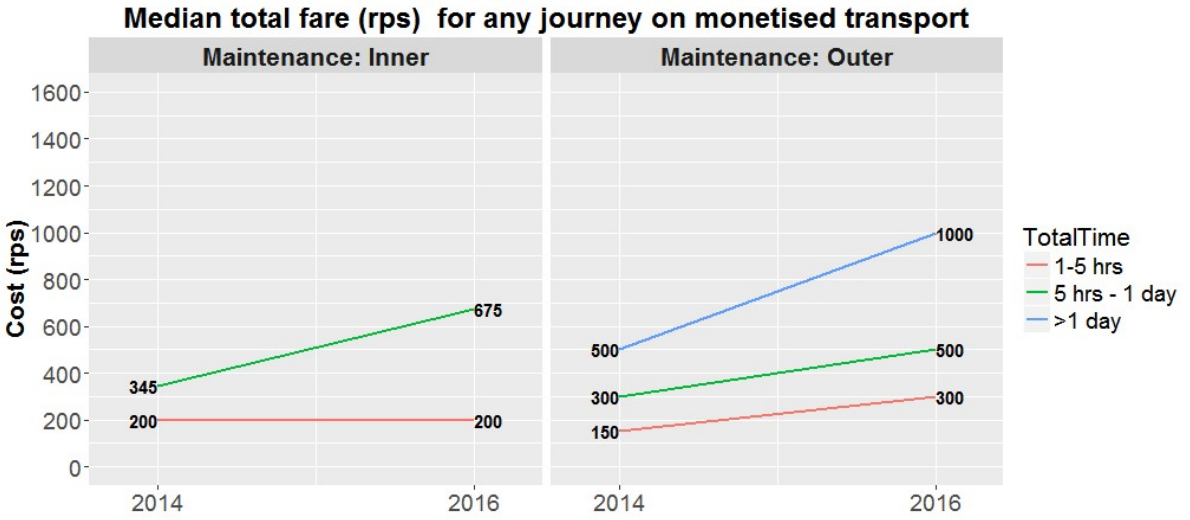
Table 43: Perception of changes as a result of road works

	Agree	Disagree	Net
The roads have allowed more people to access to healthcare facilities	78%	9%	+68%
The roads have allowed more people to access educational facilities	75%	11%	+65%
The roads have generally improved the livelihood of people within the community	73%	11%	+61%
The roads have generally improved the environment to start your own business in the community	68%	11%	+57%
The roads have helped to increase the employment opportunities in the community	62%	19%	+43%
The roads have helped to increase the quantity of goods that people in the community are able to sell	53%	25%	+29%
The roads have helped to increase the prices that people in the community are able to sell their goods	51%	29%	+22%
More people in the community plan to start their own new business in next two years due to the road	33%	14%	+19%
The roads have helped to reduce the costs of essential food items that are imported outside the district	47%	32%	+16%

	Agree	Disagree	Net
The roads have led to more people in the community migrating to other regions temporarily	38%	37%	+0%
The roads have led to more people permanently leaving the community	35%	41%	-6%
The roads have led to people outside the community to purchase land within the area	26%	46%	-20%
The roads have led to an increase in crime in the community	15%	68%	-53%

3.1.3 Transport fares

Figure 70: Median total fare for any journey on monetised transport



The average fare paid for journeys increased when considering all journeys to services that respondents indicated would involve a fare. This was particularly apparent for journeys taking longer than one day, where the median fare paid at least doubled between 2014 and 2016. Prices for shorter journeys (<5 hours) remained similar, with the exception of the maintenance outer area where these fares also showed a large increase (Figure 70).

In the RCA study maintenance areas, there was a marked increase in public transport availability and people were very pleased that these are Boleros rather than what they perceive as unsafe and slow tractors. People say this is a direct result of better maintained roads. Fares for these relatively short journeys had gone down, people said, because of the competition between drivers and because they could make more trips than previously. However, people said these fares were not fixed despite guidelines from the district and still depended on one's bargaining position, so, for example, teachers pay the most and young women the least.

Table 44: Percentage of all households using monetised transport to reach services

Service	Inner		Outer	
	Baseline	Midline	Baseline	Midline
Agro-vet	4%	10%	2%	6%
District HQ	43%	53%	46%	43%
Agricultural Centre	13%	21%	13%	14%

Table 44 indicates that the percentage of households using monetised transport to reach three different services has generally increased between the two surveys. The three services, agrovets, district HQ and agricultural centres, were the only services for which a substantial number of respondents indicated paying to reach. The most common service where a monetised transport method would be used to travel to was the District HQ, which showed a large increase in the use of monetised transport since the baseline survey within the inner maintenance domain.

3.2 Access to social services

3.2.1 Schools

Use of local primary and secondary schools remained at similar levels to 2014, with around 70% of all households with school-age children using the nearest primary school on a daily basis and 55% using the nearest secondary school. This is unsurprising since primary school provision is at community level and schools have been sited to minimise walking distance for this age group. Indeed the survey shows there were no significant changes in the accessibility of primary or secondary schools. All communities surveyed were within 2 hours travel of a primary school travelling on foot, and the vast majority were within 30 minutes. Secondary schools were slightly more accessible in the inner areas than the outer areas, but all communities were within 3.5 hours of a secondary school in both of the domains at the midline survey.

There were contrasting shifts in the perception of the quality of local primary schools in the inner and outer maintenance areas. Within the inner domain the 30% of households indicated that they rated the primary school as ‘good’ at the midline, an increase from 23% at baseline. However, only 19% of households in the outer maintenance domain rated their primary school as ‘good’, a decrease from 27% at the baseline.

A similar downwards shift was seen in the outer domain for secondary schools as well, with 21% indicating that they believed their local secondary school to be good, a reduction from 33% at the baseline. No major change occurred within the inner buffer towards their perception of secondary school quality. The RCA study conversations suggest that the more remote the community the worse the teacher quality and retention of teachers, so that the change in perception of school quality in outer maintenance areas may be reflecting this.

Figure 71: Perceived quality of primary school

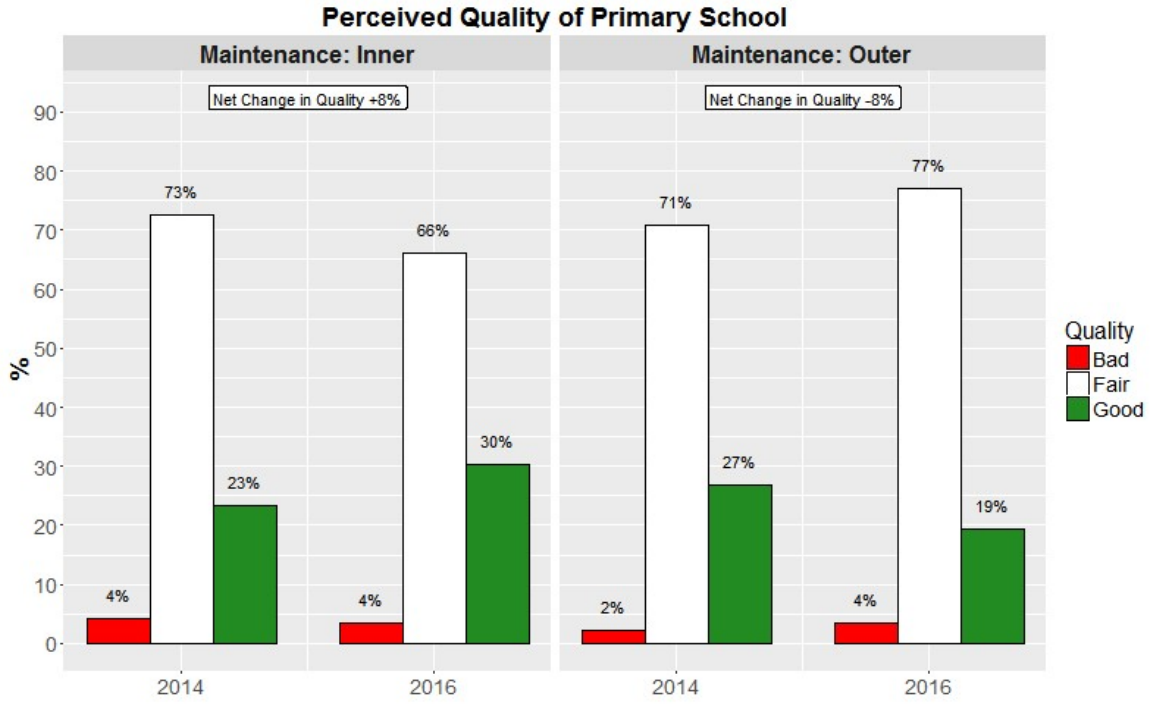
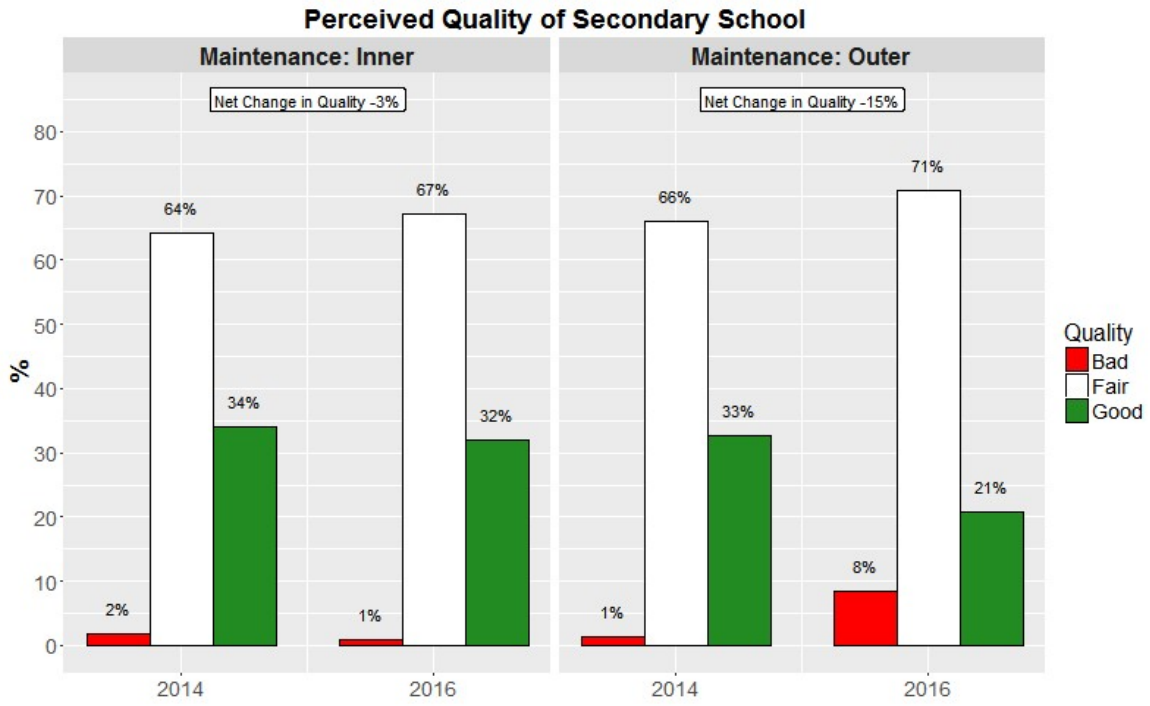


Figure 72: Perceived quality of secondary school

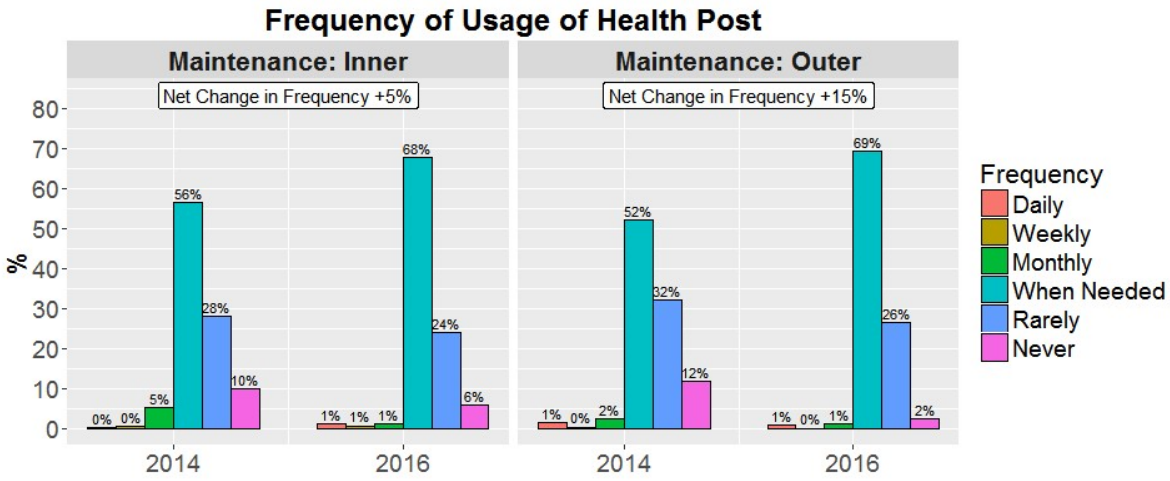


3.2.2 Health posts

Health posts were used more frequently at the midline than the baseline, across both inner and outer domains. The percentages of households 'never' using health posts reduced in the maintenance areas from 10% to 6% in the inner area and from 12% to 2% in the outer area (Figure 73). This RCA study (and others) shows a strong preference for medicine shops over Government health posts, as they are considered to be better stocked, are open more convenient hours and are run by trusted pharmacists.

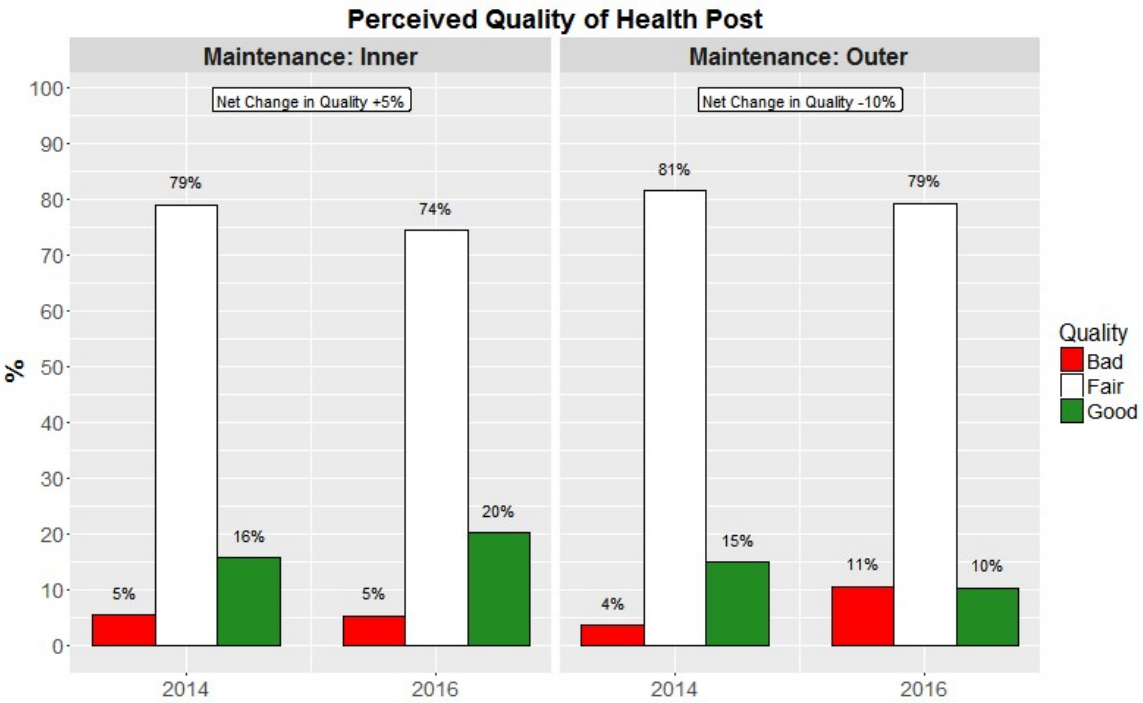
There were no significant shifts in the accessibility of the health posts. Increased use is therefore not a function of RAP intervention. The RCA noted that there has been considerable Government investment in improving the health posts through investment in infrastructure (especially birthing centres) and introduction of new programmes (e.g. youth friendly outreach services and HIV/AIDs services).

Figure 73: Frequency of use of health post



The quality of the health post was rated as slightly better between baseline and midline in the inner maintenance area. The outer maintenance area showed a significantly reduced perception of quality of their health post, with only 10% rating it as good (down from 15%) and 11% rating it as bad (up from 4%) (Figure 74). The RCA finds that, like schools, health posts in more remote areas (equivalent to outer maintenance areas) experience problems retaining staff and maintaining supplies.

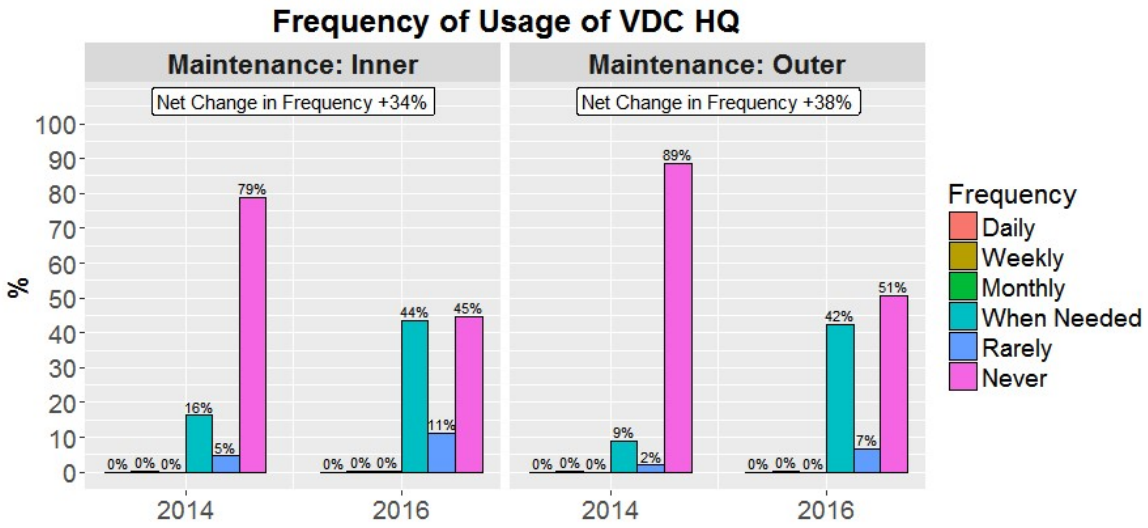
Figure 74: Perceived quality of health post



3.2.3 Village Development Committee (VDC) Headquarters

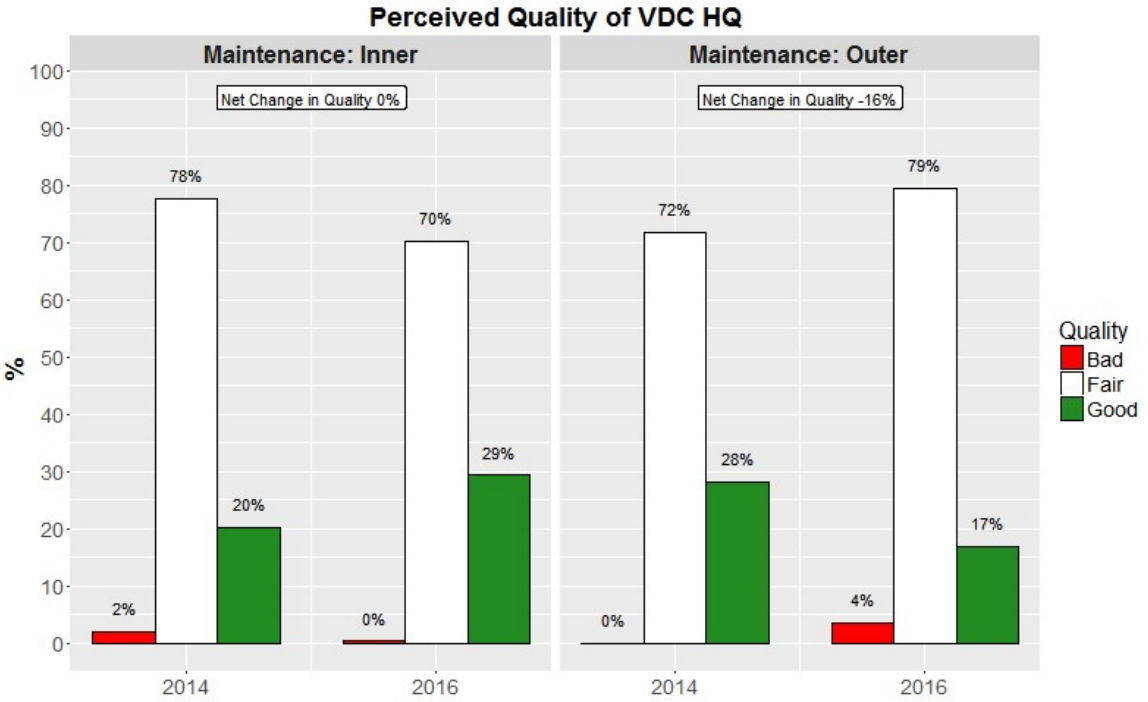
VDC HQ visits increased substantially in all four domains between 2014 and 2016. Only 21% of respondents in the inner maintenance area indicated ever visiting the VDC HQ; this increased to 55% at the midline. There was an even larger shift in the outer maintenance where users of the VDC HQ increased from 11% of households to 49% of households (Figure 75).

Figure 75: Frequency of use of VDC HQ



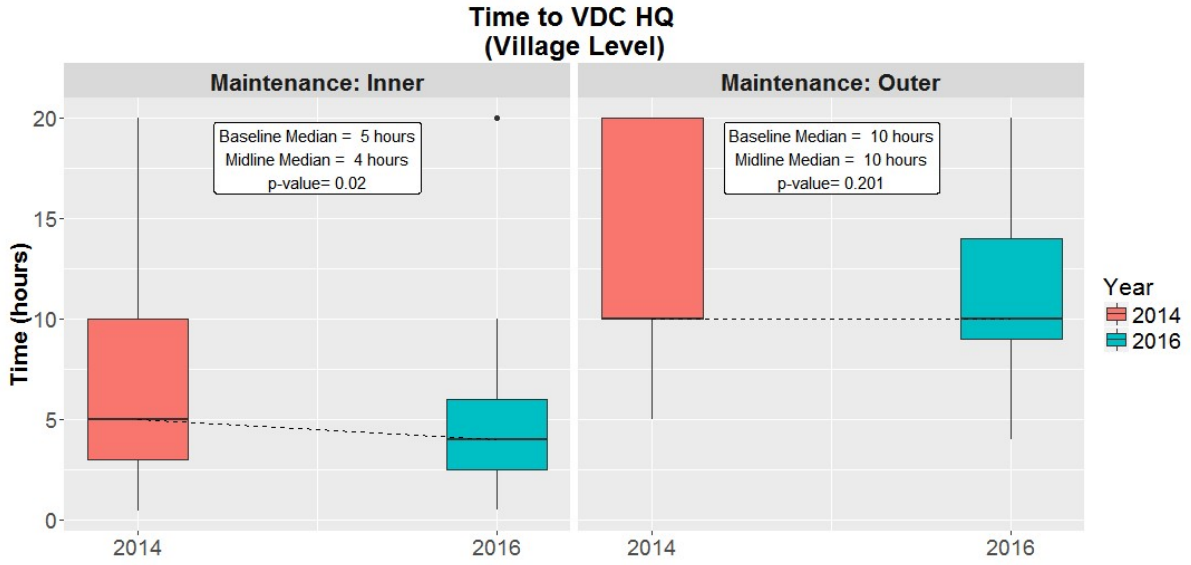
Generally, the increased usage was not reflected in a hugely increased perception of the quality of the service provided at the VDC HQ. Around 20% of those in the build areas rated the service as good, although only 3% rated it as 'bad'. The HQ did see an increase overall in the maintenance inner domain, where 29% rated it as good, but a decrease in perceived quality from the outer maintenance domain where only 17% rated it as 'good' (Figure 76).

Figure 76: Perceived quality of VDC HQ



The time to the VDC HQ decreased from 5 hours to 4 hours in the inner domain and remained at 10 hours (1 day) in the outer domain. The decrease in time is likely to be associated with the increased use of fare-paying transport to attend the VDC rather than walking (Table 44).

Figure 77: Time to VDC HQ



3.3 Access to economic services

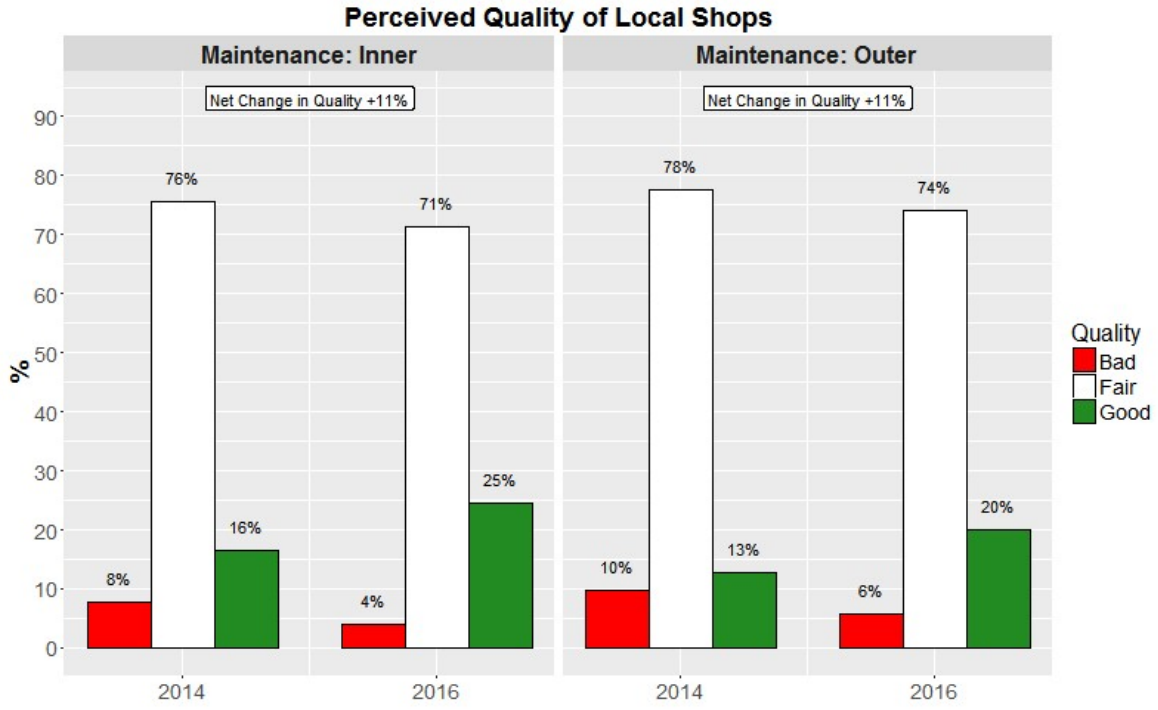
3.3.1 Local shops

Use of local shops remained high, with very few fluctuations from 2014 baseline. Nearly all respondents indicated that they used local shops and around half of all respondents indicated that they used local shops on a daily or weekly basis.

There was a slight increase in the perceived quality of the local shops. At the 2016 survey, 25% in the inner maintenance area rated the quality of the shop as 'good', up from 16% in 2014 whilst in the outer areas 20% rated the shops as good, up from 13% in 2014 (Figure 78). The RCA study suggests that this rating is related to the increased diversity of products, better stocking (as more frequent small trips are made into town for re-stocking) and provision of electricity so that some goods can be chilled (such as soft drinks and beer). People in maintenance areas noted that they have less need to go into town for purchasing goods and like the local shops because of their convenience.

There was no significant change in the accessibility of the local shops; the median time to access local shops in all four domains was around 15 minutes. The RCA study found little increase in numbers of shops so accessibility would not have changed.

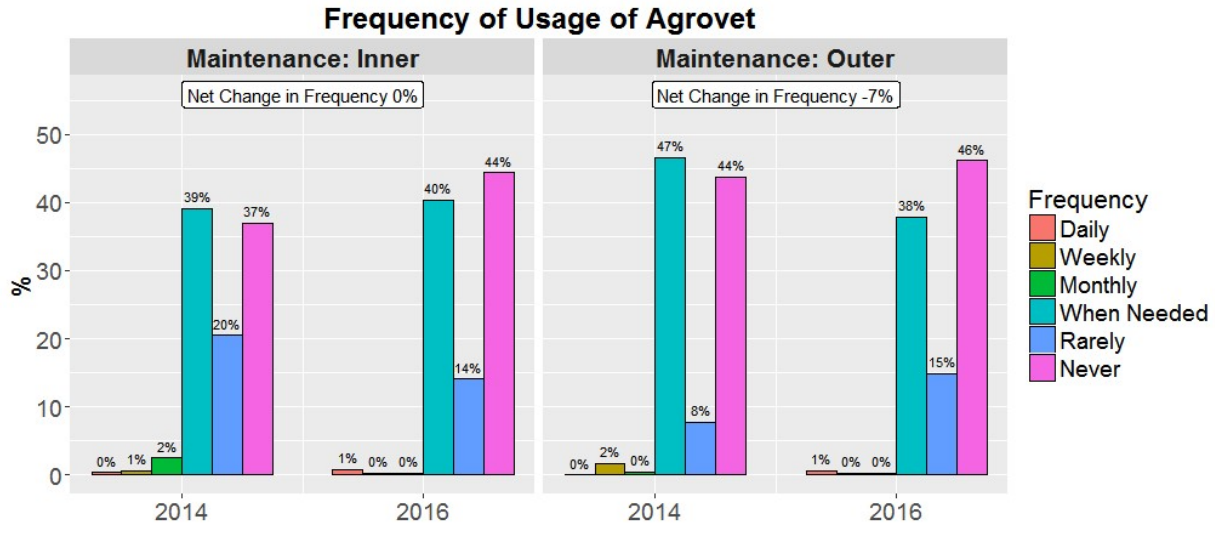
Figure 78: Perceived quality of local shops



3.3.2 Agrovets

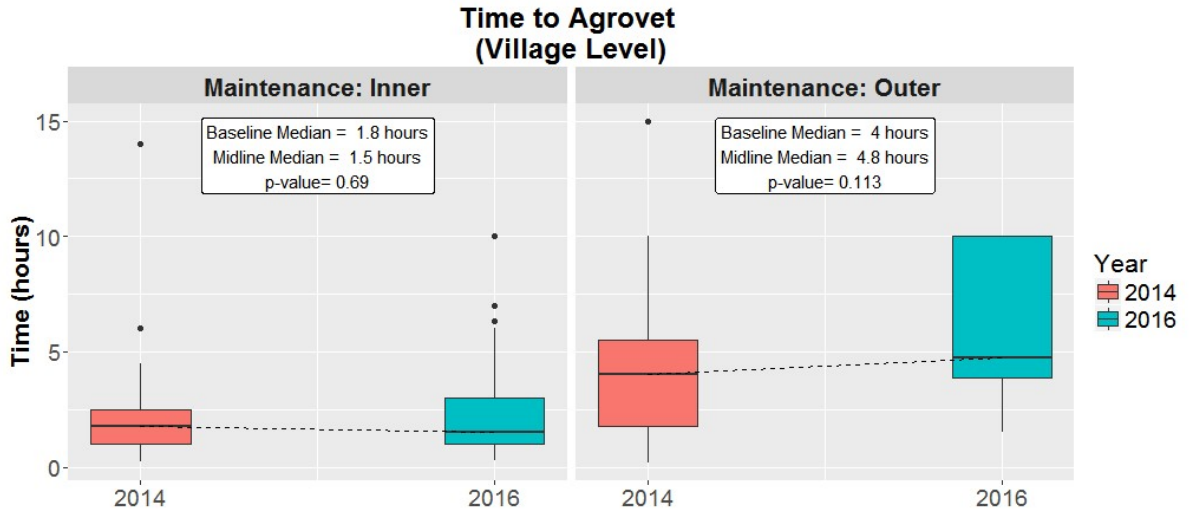
The number of people using agrovets in the maintenance areas saw a slight reduction between surveys, from 63% to 56% in the inner maintenance domains and from 56% to 54% in the outer maintenance area (Figure 79).

Figure 79: Frequency of use of agrovet



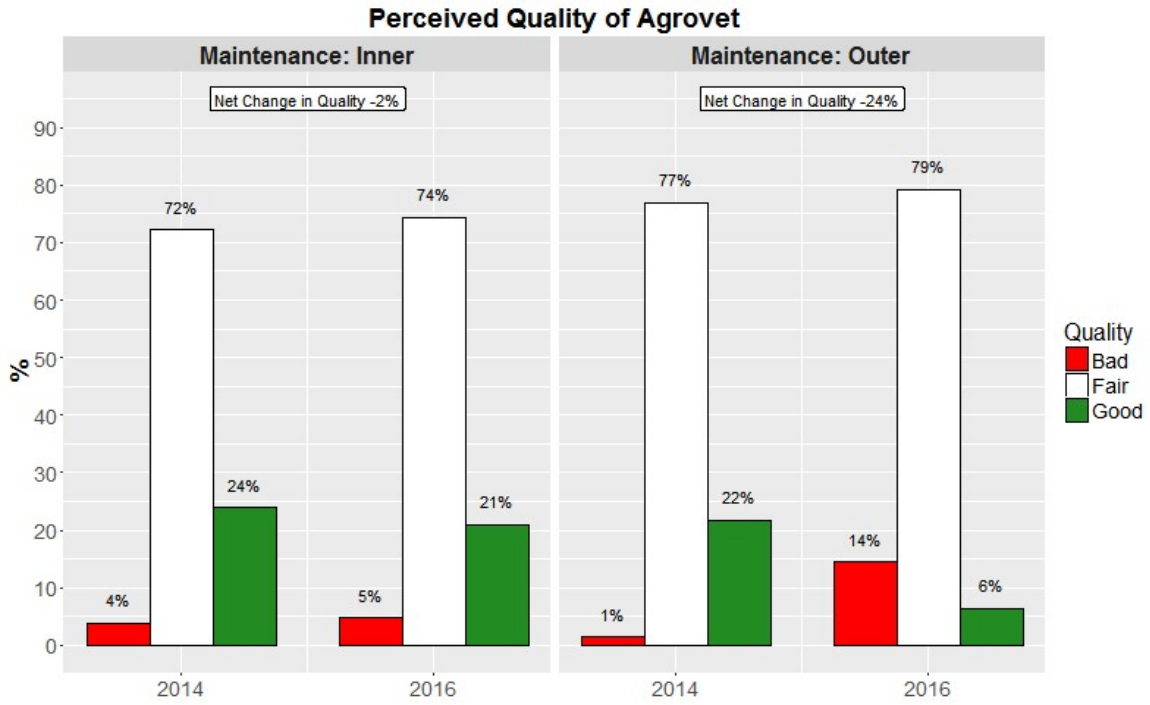
There was no significant shift in the accessibility of the agrovet in the maintenance areas (Figure 80).

Figure 80: Time to agrovet



The quality of the agrovet service was similar to baseline for the inner maintenance and outer build areas. However, outer maintenance areas saw large negative shifts in perception. In the outer maintenance only 6% of respondents rated the agrovet service to be 'good', down from 22% at baseline, whilst 14% rated it to be bad, up from just 1% at baseline. There was only a very minor shift in perceptions of the agrovet within the inner maintenance area (Figure 81).

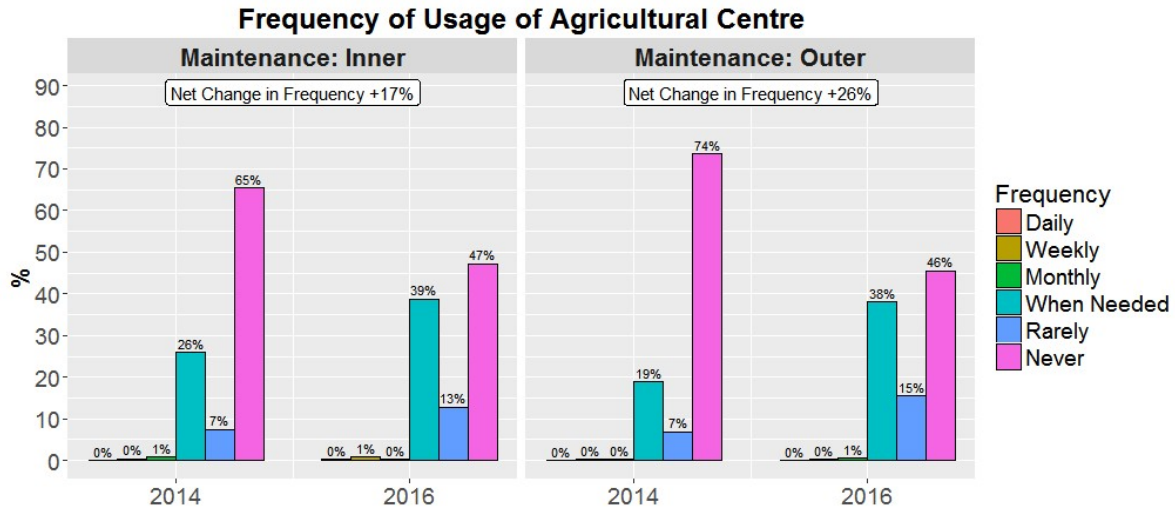
Figure 81: Perceived quality of agrovet



3.3.3 Agricultural centres

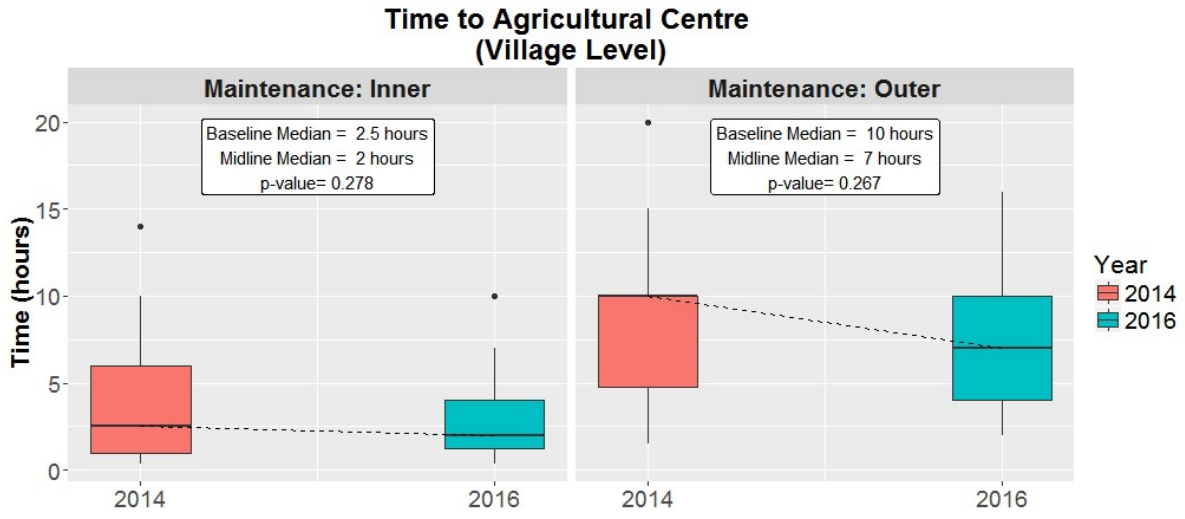
There was an increased use of agricultural centres between the two surveys. Over half of respondents indicated that they used the agricultural centre closest to them at some point, compared with only around 45% at baseline for the inner maintenance and 25% for the outer maintenance area.

Figure 82: Frequency of use of agricultural centre



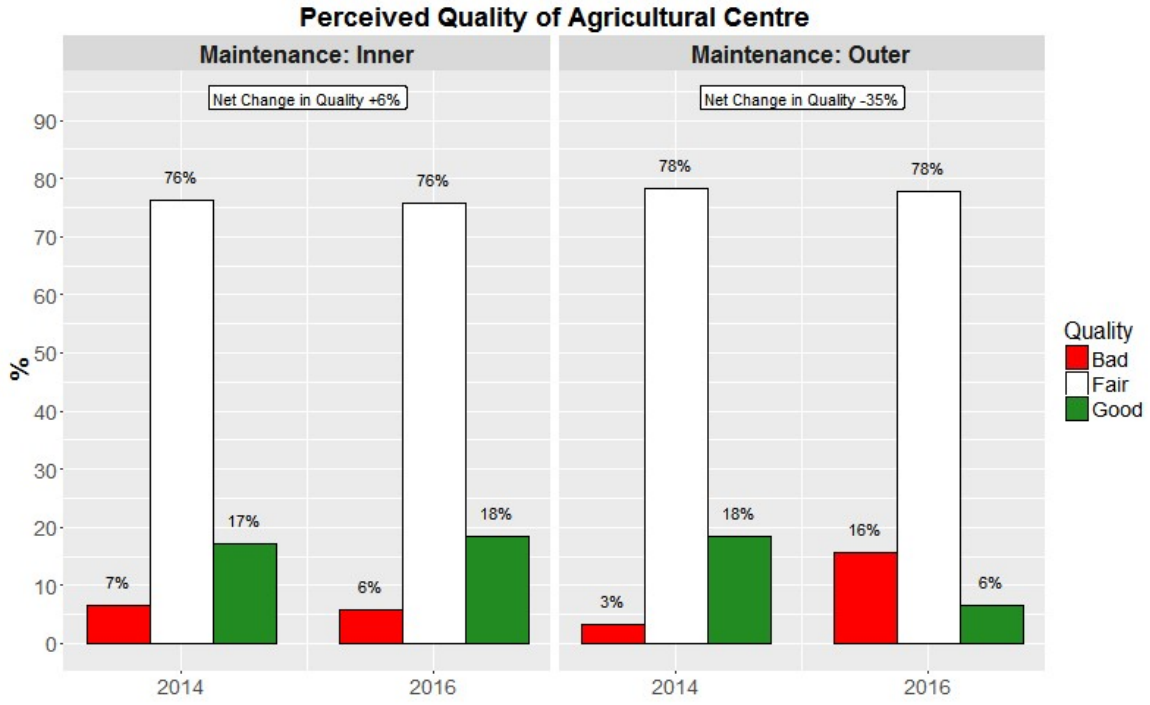
The increased frequency of use was not a result of increased accessibility, as the journey time to the agricultural centre did not significantly reduce in either domain (Figure 83).

Figure 83: Time to agricultural centre



The quality of the agricultural centre was seen as more or less the same as in 2014 within the inner maintenance area. Within the outer maintenance domain where there was a large negative shift in perceptions, 16% rated the service to be bad (up from 3% in 2014) and only 6% rated it to be good (down from 18% in 2014) (Figure 84).

Figure 84: Perceived quality of agricultural centre



3.4 Local enterprises and economic activity

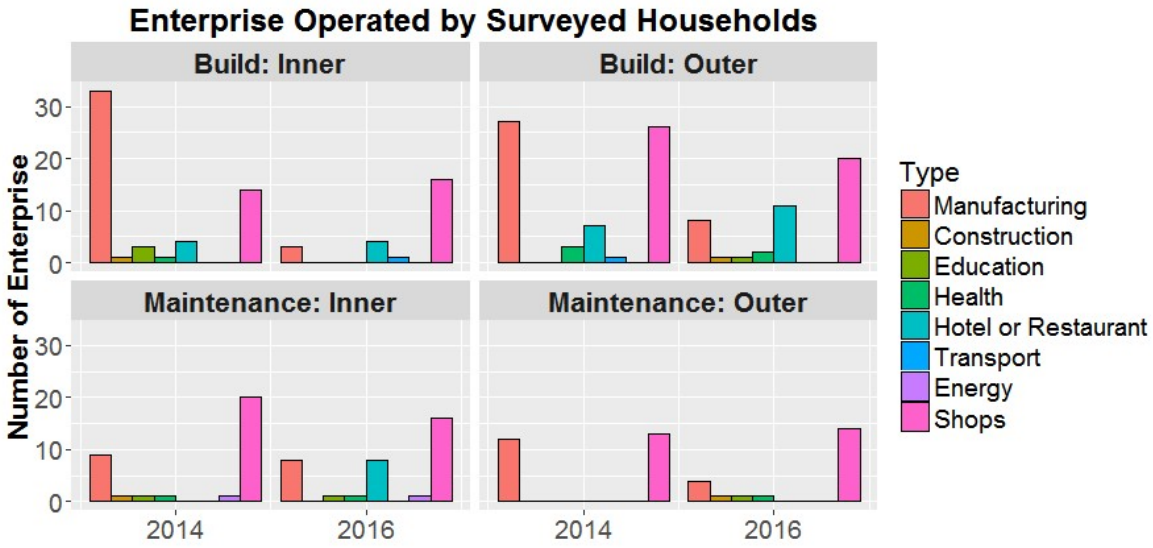
3.4.1 Enterprise activity

The total number of households in the survey running private enterprises reduced dramatically between the 2014 baseline and the 2016 midline in the build districts, and stayed relatively consistent in the maintenance. However, there was a large turnover in which surveyed households were running enterprises. In the maintenance region and in the inner build region the majority of households running enterprises in 2016 were not running enterprises in 2014. In all domains the majority of households who were running enterprises in 2014 were not running enterprises in 2016 (Table 45).

Table 45: Change in number of private enterprises

	Build		Maintenance	
	Inner	*Outer*	*Inner*	*Outer*
Number of Private Enterprises (Baseline)	*52*	*59*	*33*	*25*
Number of Private Enterprises (Midline)	*24*	*40*	*33*	*20*
Enterprises Operational in 2014 & 2016	*8*	*25*	*11*	*6*
Enterprises Started After 2014	*16*	*15*	*22*	*14*
Enterprises Stopped After 2014	*44*	*34*	*22*	*19*

Figure 85: Enterprise operated by surveyed household



There was a clear shift in the types of enterprise being conducted away from manufacturing enterprises (in all categories – agricultural, clothing, metals, woods, etc.) and towards hotels/restaurants. In 2014 the manufacturing category was the largest overall, accounting for 60 of the 111 enterprises in the build areas. This reduced to just 11 out of 46 enterprises from the midline survey. A similar trend was seen in the maintenance survey areas – in 2014, 21 of the 58 enterprises in the maintenance areas were manufacturing enterprises whereas in 2016, only 11 of the 46 enterprises were in the manufacturing category.

The number of hotels/restaurants being run by surveyed households increased, or stayed the same in all four domains. Particularly notable was the number of hotels/restaurants being run in the inner maintenance domain which increased from 0 among surveyed households in 2014 to 8 in 2016. Very few of the householders operating hotels/restaurants had stopped operating between the two surveys (Figure 85).

Figure 86: Enterprises opened by surveyed households between 2014 and 2016

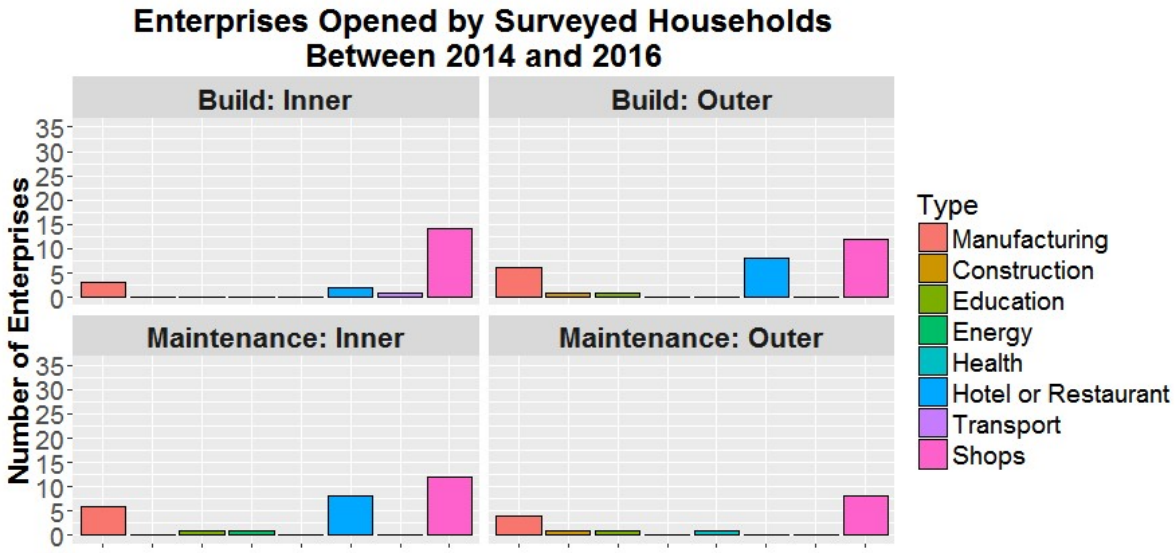
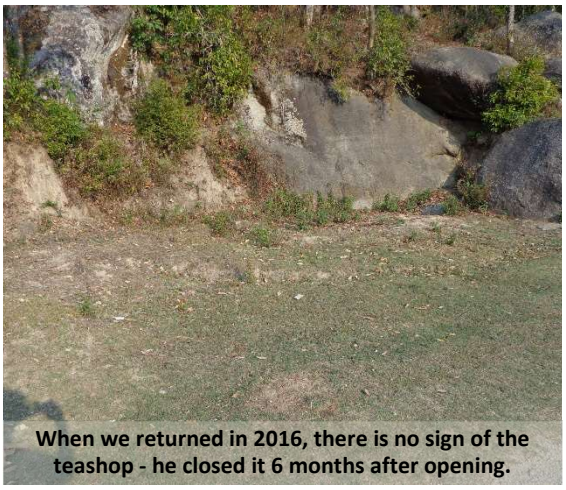


Figure 87: Enterprises no longer operated by surveyed households between 2014 and 2016

Shops were the most frequent enterprise in 2016, and remained at a similar level to 2014, with the exception of the outer build area where the number of shops decreased from 26 to 20. However, there was a large amount of turnover in these shops, with households who had run shops in 2014 no longer operating and many of the households operating shops who had not been in 2014 (Figure 87). Remaining enterprise types were fairly infrequent across both surveys.

From the RCA study several shops that opened with optimism in Doti in 2014 along the RAP road have closed. One had been run by a former migrant worker who told us he wanted to settle back down in his village. There is no trace of his teashop now. He closed down within six months and is now back working in India. The photos show the change from 2014 and 2016.

The teashop owner returned from India to set up this teashop on the RAP road in 2014



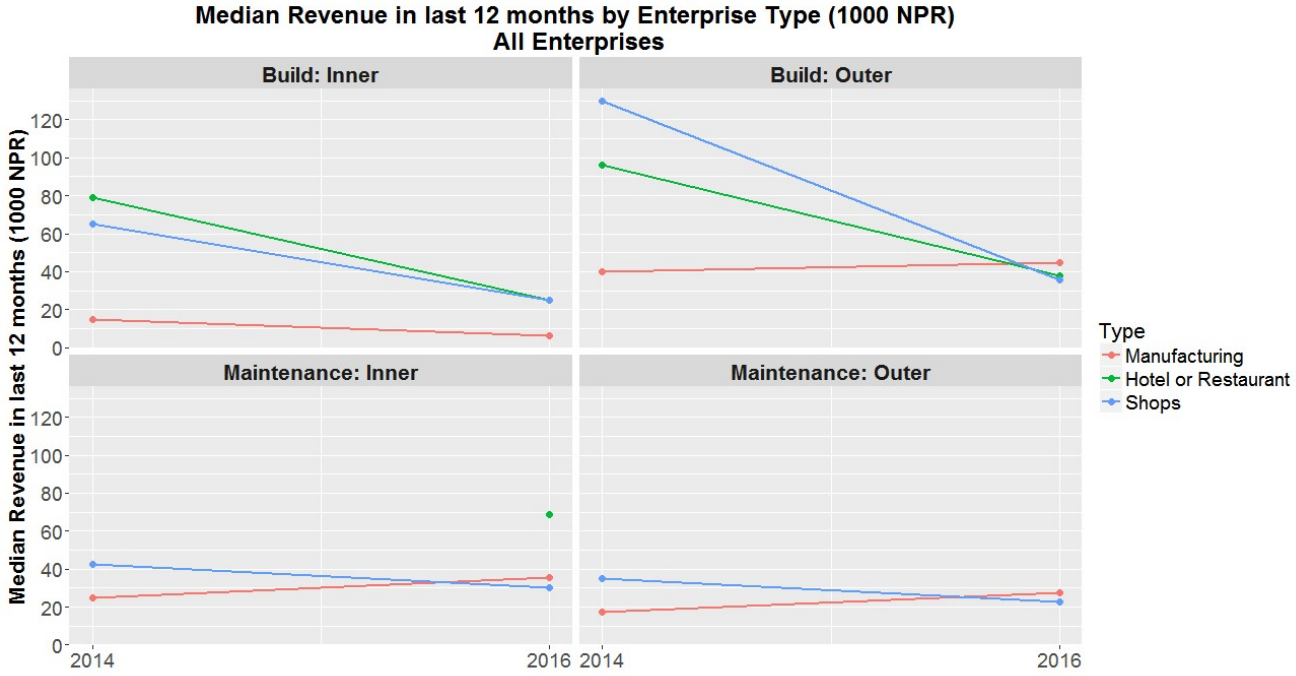
When we returned in 2016, there is no sign of the teashop - he closed it 6 months after opening.

3.4.2 Enterprise revenue

The median revenue per enterprise remained similar in the inner maintenance domains, with the average annual gross revenue staying at around 35,000 NPR. There was a decrease in the median revenue from an individual enterprise from 30,000 to 20,000 NPR in the outer maintenance area. Median income from households operating manufacturing type enterprises was up slightly from the baseline whilst the median income per shop was down slightly between the two surveys. The increase in median income from manufacturing needs to be considered in conjunction with the large reduction in the number of enterprises falling under this category, implying that the less profitable manufacturing enterprises are those that have no longer continued. There were no hotels/restaurants recorded in the baseline survey within either of these domains but the median income at the midline survey from this type of business was high in relation to other categories of business: 70,000 NPR.

The median income from hotels/restaurants and shops was down substantially in the build areas. In the inner build the median income for hotels/restaurants in 2014 was NPR 80,000 and down to NPR 35,000 at 2016. An even bigger decrease was seen in the outer build – from NPR 95,000 in 2014 to NPR 40,000 in 2016. In the build areas, revenues from shops also decreased by a similar amount. Decreased revenues in the build areas for shops and restaurants may be an indication of increased competition (Figure 88).

Figure 88: Median revenue in last 12 months by enterprise type – all enterprises



Considering only the enterprises which were operational in both 2014 and 2016 and accounted for in the survey, again this shows a decrease in the revenues from shops in all domains. The maintenance domains saw almost identical drops in the median income for comparable enterprises – from around 50,000 NPR to around 25,000 NPR per year. The inner build domain saw a reduction in the median income per shop from 50,000 NPR to 25,000 NPR. There was a larger drop in the outer build, but the income was still higher on average than any of the other three domains – 50,000 NPR on average at the 2016 survey, down from 100,000 NPR on average in 2014. Overall only 22% of continuing enterprises recorded that they had earnt more money from the 12 months up to the May 2016 survey than they had in the 12 months up to the May 2014 survey. This was consistent across the four domains (Figure 89).

Figure 89: Revenue in last 12 months – continuing enterprises

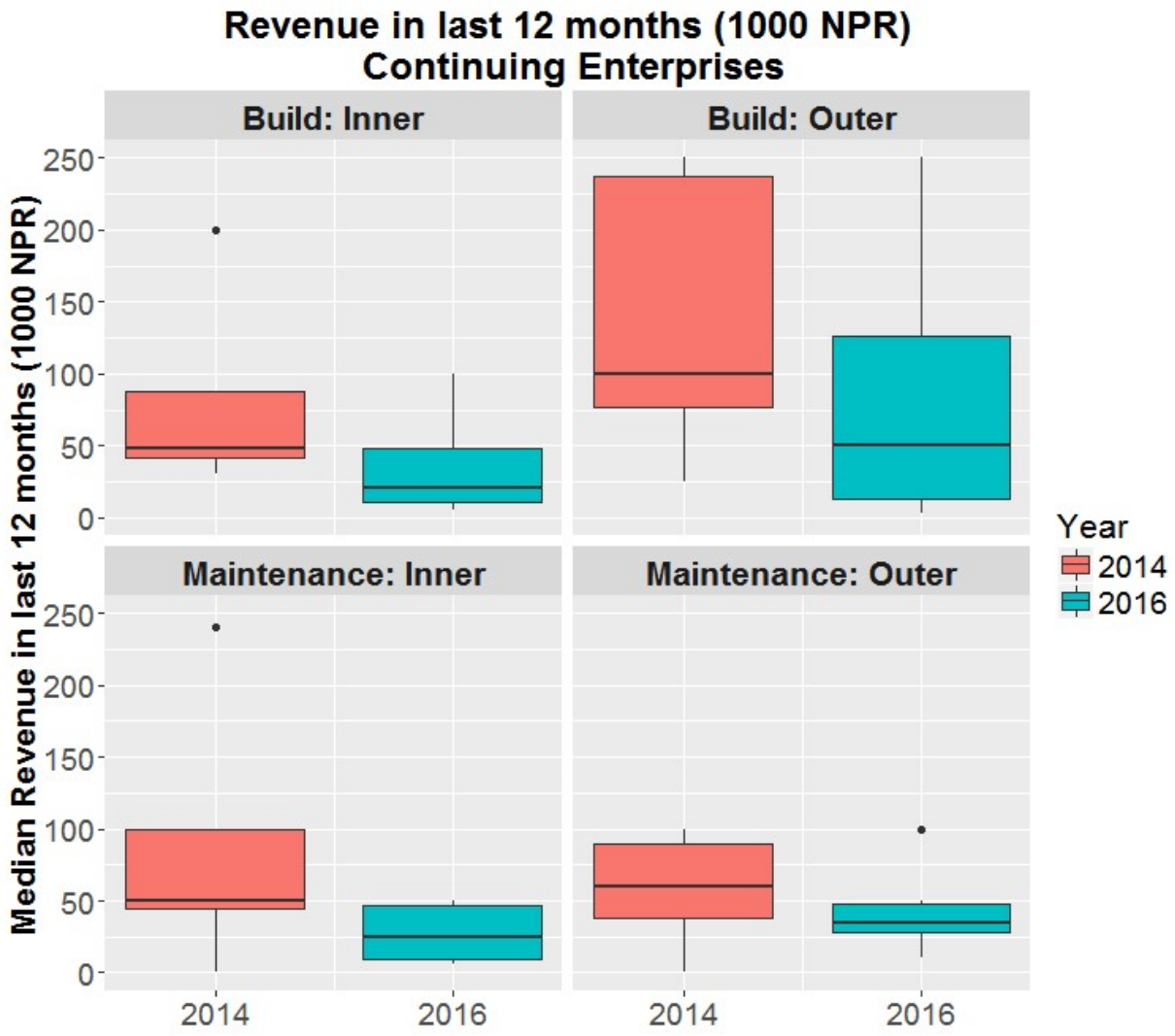


Table 46: % of enterprises operating with 'no major problems' in build and maintenance area

		Build		Maintenance	
	Year	Inner	Outer	Inner	Outer
% of enterprises operating with 'no major problems'	**2014**	32%	20%	32%	28%
	2016	12%	12%	46%	29%

Table 46 shows the percentages of enterprises where the owners indicated that they were able to operate with no major problems. 46% of businesses in the inner maintenance were said to be running without major problems, an increase from 32% at the baseline. The RCA study found an increased sense of optimism among shop keepers compared with 2014 (see case study). The most commonly identified problems in the inner maintenance area at the midline were capital or credit problems (34% of businesses) and electrical power supply problems (29% of businesses). At the baseline the most identified reason for problems was capital or credit, but the second most selected answer at baseline was transportation problems. At the midline survey zero businesses in the inner maintenance area selected transportation problems as a major issue affecting their business.

RCA case study: New mood of optimism among retailers and businesses in Achham

Two years ago, my host household father explained that years ago during the RAP road construction many small businesses set up responding to the needs of construction workers, especially for clothes, shoes, food and medicines. He himself left agriculture to set up a clothes shop and medicine shop. These small commercial enterprises thrived and enabled many owners to purchase land in the Terai. But when we chatted two years ago, he felt that business was falling off especially as the road was now being extended up the mountain. New shops were being established along the newer part of the road and he feared they would take trade away from them as people further up the road would not bother to come to this market any more. He and his fellow tradespeople vented their frustration and there was a general mood of pessimism with many sharing that they were contemplating selling up and moving permanently to the Terai.

But two years later in 2016 the mood has changed. There are new shops and new construction including expansion to businesses throughout the market. 'My' family's clothes shop and medicine businesses were busy throughout the day and, by 'my' father's estimation their sales have increased by 1.5 to 2 times the 2014 rate (*'I sell about 15,000–20,000 NPR goods per day now'*). His demeanour has changed and he is no longer talking about moving to the Terai. He has a new motorbike which he uses to make home visits for selling medicines. He cheerfully shared his plans to construct a concrete house and sees the family remaining here now. A tailor neighbour has expanded his business from four to eight sewing machines which are kept busy every day. A micro-finance company has just opened and the Co-operative is flourishing. Plans to open a community-run 'boarding school' are in the pipeline. All I spoke with have hopes that this small market will now become a small business hub for the area.

So what had caused this change? People explained that the shops anticipated to be established further up the road did not materialize in substantial numbers and people living in villages further up the road still need to come to this market. The better maintained road has encouraged the establishment of transport businesses so that there are at least two Boleros plying regularly and offering lower fares than before. There is now a collective sense of optimism and willingness to invest in developing the area by the business people there.

In the outer maintenance area, transportation problems were identified as the most common problem affecting their business at both the baseline and midline surveys, with credit/capital problems selected as the second most common problem.

In the build area fewer businesses indicated that they were operating with no major problems at the midline survey than had at the baseline survey. In the inner build area, 58% of businesses indicated credit or capital problems and 42% indicated transportation problems at the midline survey. At the baseline survey, credit/capital problems were again the most selected, with equipment problems the second most selected. In the outer build, transportation (69%) and power supply (60%) were seen as major problems by the majority of respondents at the midline. At the baseline, transport problems were also seen as the most prominent problem facing businesses, but very few respondents selected power supply as an issue in this survey, with capital/credit problems being the second most selected issue facing businesses.

Part 4: Impact of Social and Economic Development (SED) Sub-component of RAP3

This section of the report provides a short 'de facto endline' for the SED sub-component of RAP as it is no longer being carried out. The methodology in Section C of the report outlines the sampling framework for SED. In short, almost all SED beneficiaries were also in RBG groups, thus making it more problematic to isolate the impact of the SED activities. However, to get around this the best comparison group for the SED interventions in the build area is the RBG domain rather than the inner domain, as a comparison between SED and inner buffer is dominated by any effects from the RAP wages. Thus any comparison between RBG domain and SED is more accurately a comparison between RBGs with SED and RBGs without SED. However, this is not the case for the maintenance domains where the original planned comparison is possible.

Summary of Part 4:

Impact on poverty (see 4.1)

- The SED sub-component of RAP had no impact on poverty or PMT consumption.

Impact on improved crop use (see 4.2)

- There is no significant difference in improved crop use in the build district for SED groups.
- In the maintenance districts, the SED groups saw a decline in the use of improved crops.

Training and group participation (see 4.3)

- In the build areas very few households indicated that they had received any formal training in the past 12 months at the midline survey. SED households were slightly more likely than RBG households to have received training at both the baseline and midline surveys.
- The maintenance area SED households were significantly more likely to have indicated that they received some form of training in the past 12 months than the inner domain households.
- There is some evidence to suggest that the SED households were more likely to have maintained their savings account than the RBG-only households.

4.1 Impact on poverty

The estimated PMT consumption in both the RBG and SED domains showed no change between the baseline and midline, although the average for the SED group was slightly below that of the RBG at both time points.

The average PMT consumption increased slightly within the inner maintenance domain (p=0.038) whilst it fell slightly within the SED domain, although the reduction within the SED was not statistically significant (p=0.364).

Therefore there is little to no impact of SED on poverty in both the build and maintenance districts.

Figure 90: PMT estimated annual consumption (build districts)

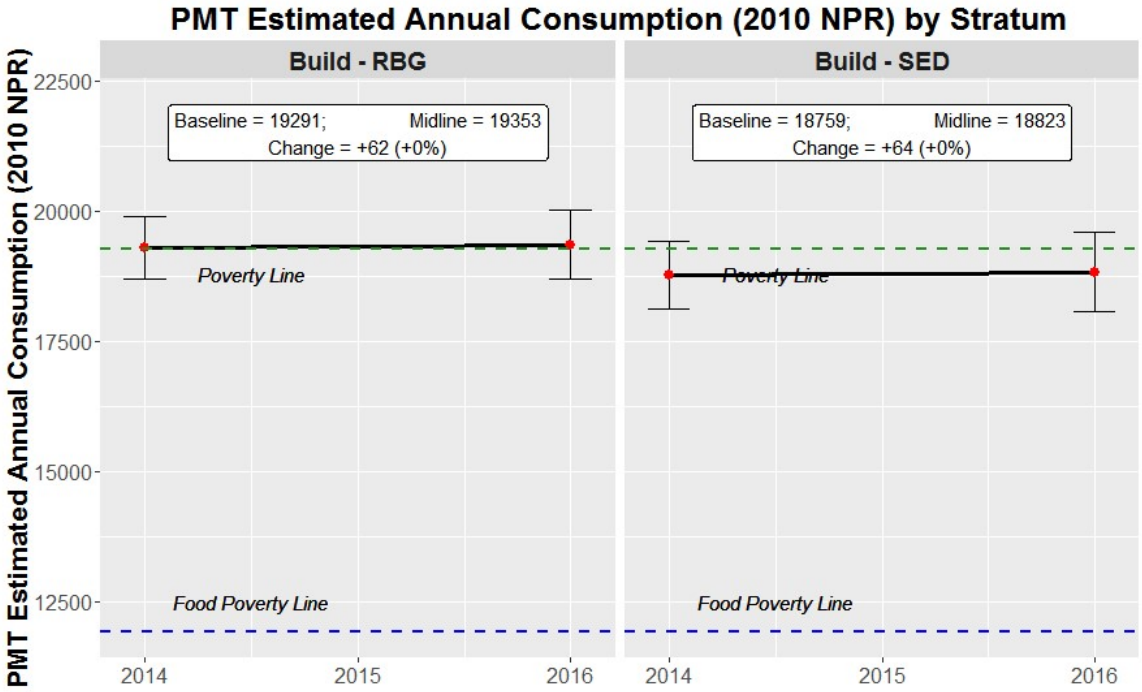


Figure 91: PMT estimated annual consumption (maintenance districts)

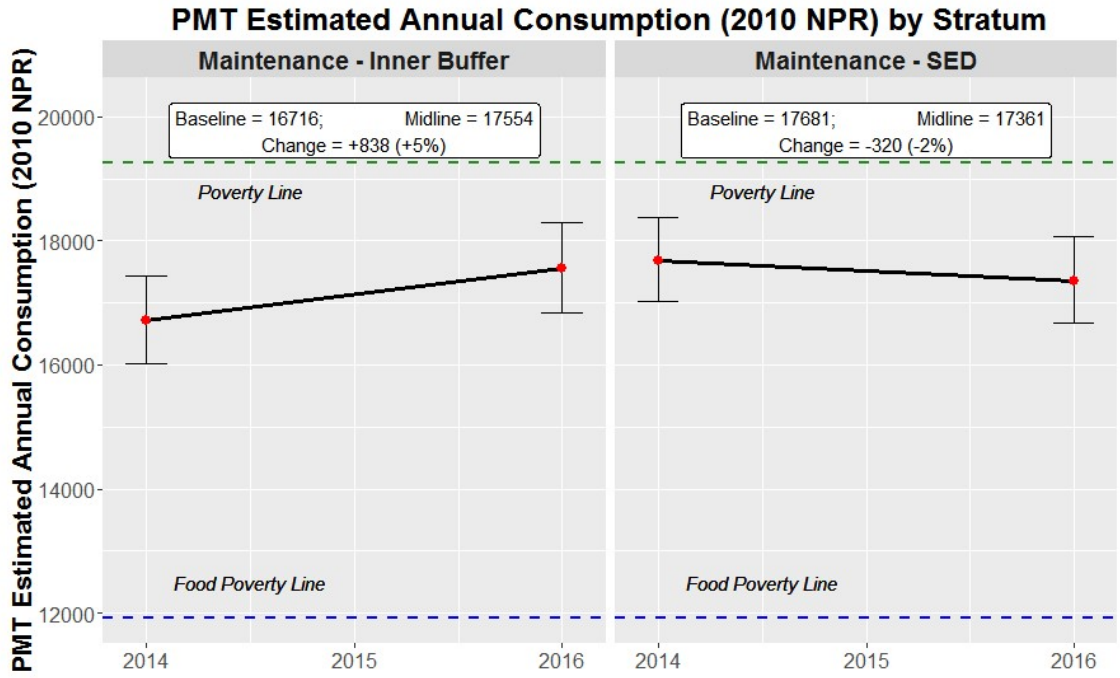


Figure 92: Value of annual household income

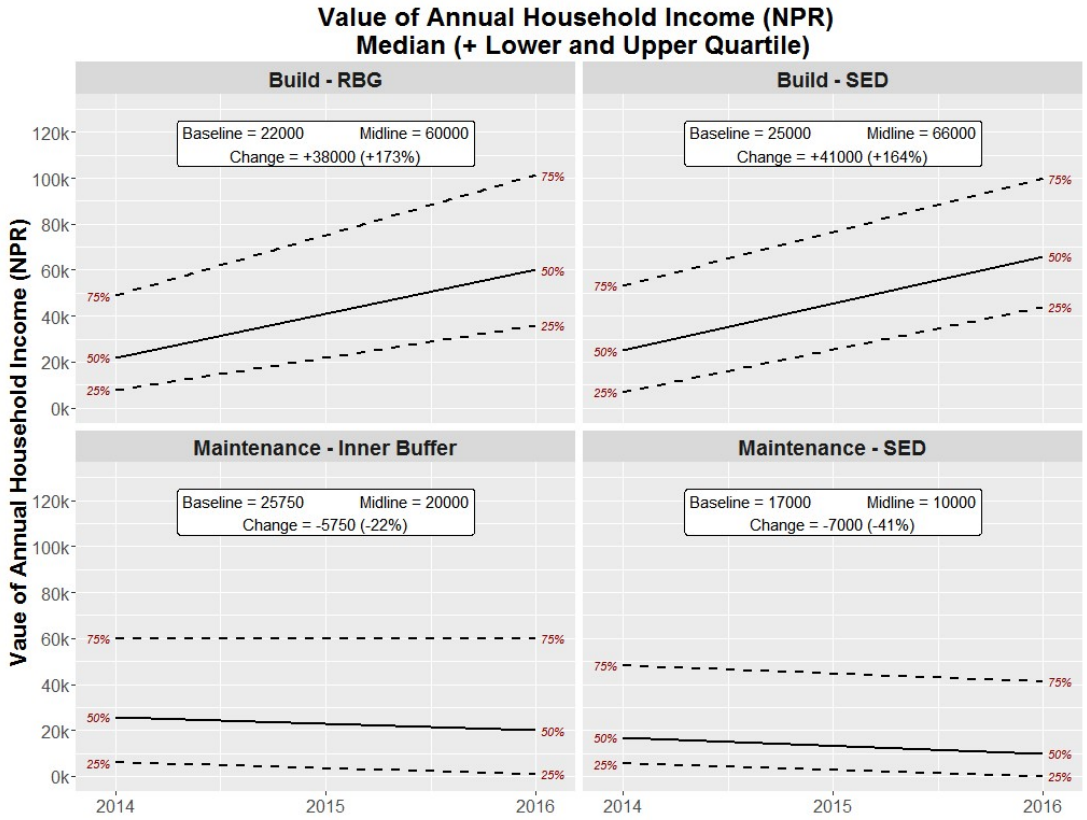
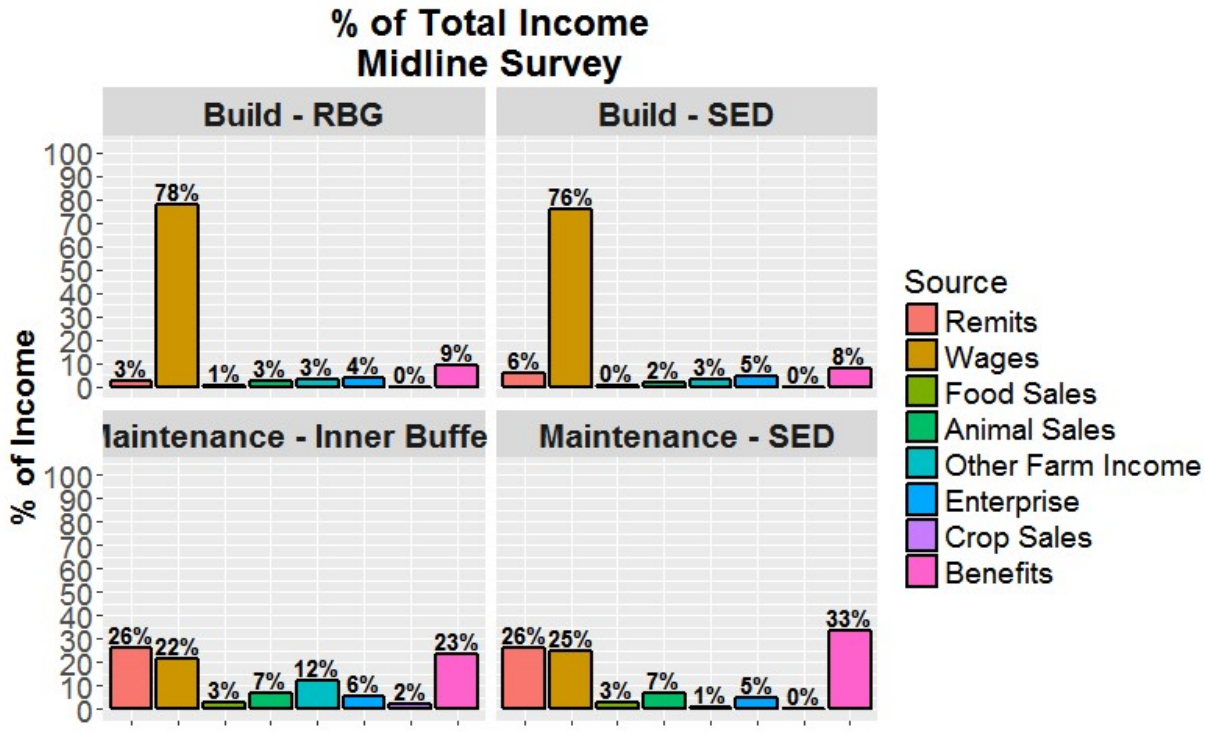


Figure 93: % of total income – midline survey



In the build areas the household incomes for the SED groups changed in almost exactly the same way as the RBG groups. Median income had been slightly higher at the baseline for the SED group and increased at a very similar rate to the RBG domain. As there is little difference between the two groups, and since the RAP wages are almost certainly the main factor for the rise in incomes for both groups, it stands that there is no significant impact of SED on incomes.

In the maintenance areas, the median SED income was lower than the inner maintenance buffer at both the baseline and the midline. The average income in both domains fell between the two surveys, falling by more within the SED domain than the inner maintenance domain.

The RCA study notes that SED was only a success for a handful of individuals who had gained previous support from other projects, had continued to benefit from SED and, most importantly, exhibited entrepreneurial acumen in succeeding. SED for most other beneficiaries was largely a disappointment.

4.2 Impact on improved crop use

Figure 94: % households using improved crops (build districts)

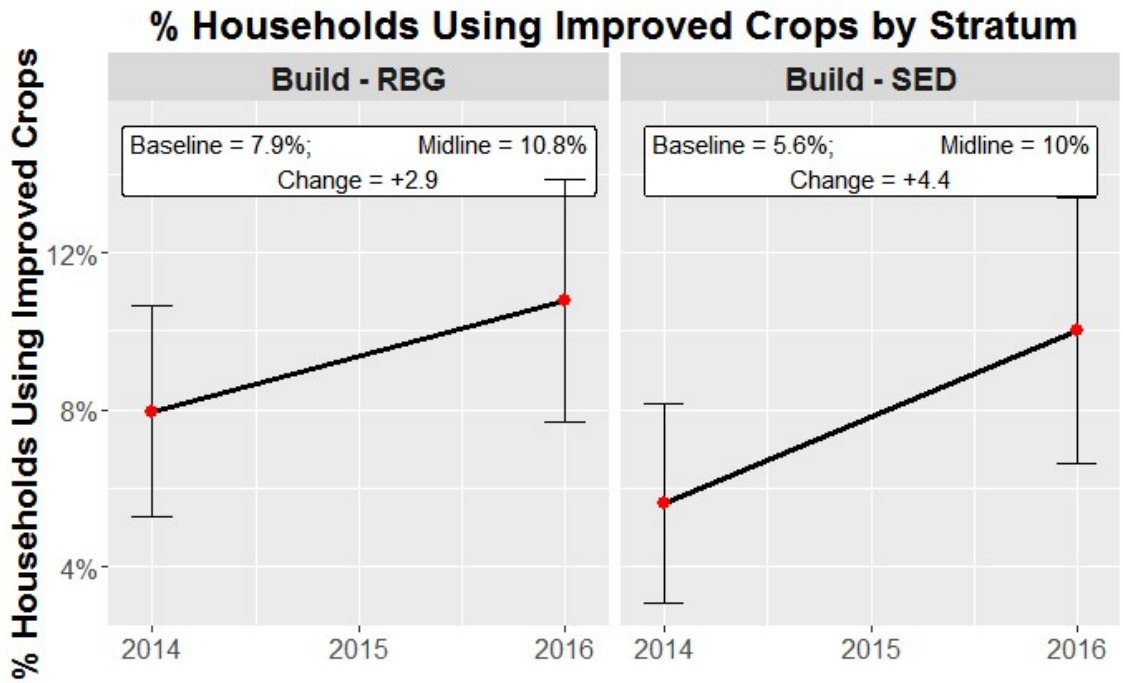
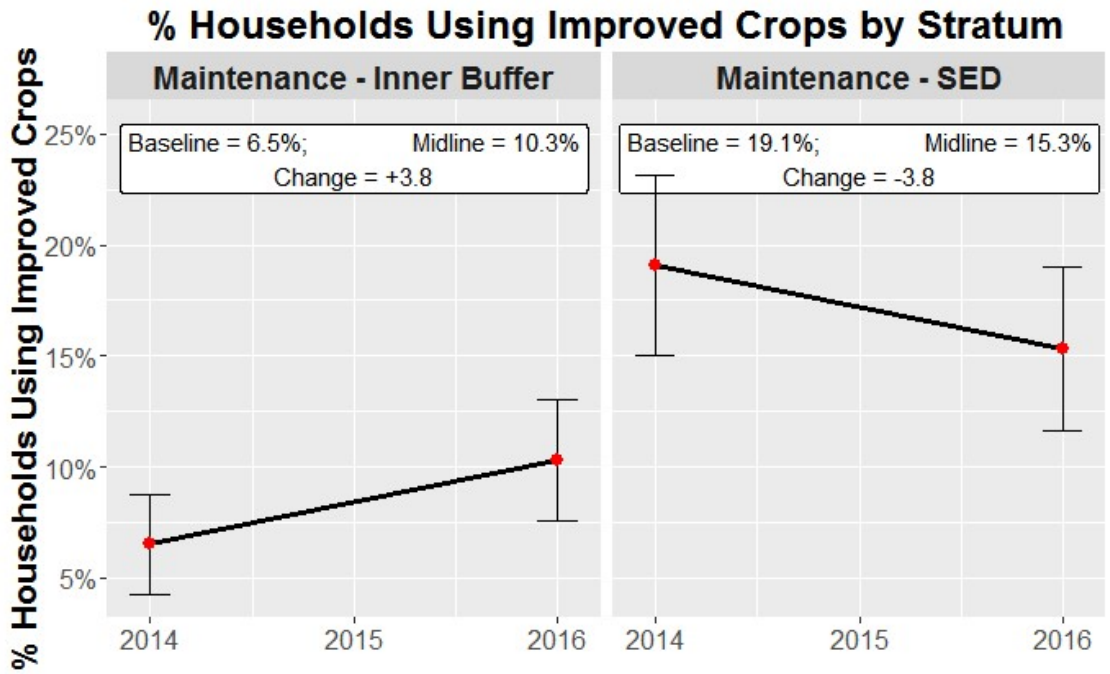


Figure 95: % households using improved crops (maintenance districts)



There is no significant difference in improved crop use in the build district, with the same pattern as those from RBGs and those in SED (also in RBGs) seeing a similar small rise, and hence no attribution to the SED activities. In the maintenance districts, the SED groups saw a decline in use of improved crops, although they started at a slightly higher point at baseline than the inner buffer which may reflect that they received some seeds and other inputs before the baseline or that this group targeted with SED activities were already practising using some improved crops.

4.3 Training and group participation

This section is not meant to describe impact but to indicate that SED activities were being rolled out and had the outcome of some increased membership in savings groups. However, as the first two sections of the report have shown, there has been little to no impact on SED groups overall.

Table 47: % households participating in groups*

Domain	Baseline – Group Participation	Midline – Group Participation
Build - SED	55%	35%
Build - RBG	39%	27%
Maintenance – SED	75%	36%
Maintenance – Inner	59%	34%

**Group participation in – Savings Groups, Cooperatives, Women's Groups or Farmer Groups*

Respondents within the SED domain were more likely to indicate that they were a member of a group fitting within the SED themes than the RBG domain at baseline. The households themselves are not asked to attribute whether the groups they attend are SED-run or not, so we cannot directly infer what proportion of groups are SED-run in any of the domains. It is unlikely that household would have been able to accurately identify which groups operating within the area were SED funded and which were not.

The proportion of households attending groups in both of these domains fell dramatically in the midline survey – from 55% to 35% in the SED and from 39% to 27% in the RBG. SED domain households were still somewhat more likely to attend a group than RBG households at the midline.

In the maintenance area, more households indicated some form of group participation in the SED and inner buffer domains than households in the build domains. SED households were substantially more likely to attend a group than the inner domain households at the baseline survey, with 75% of SED domain households doing so. As with the build domain the group participation fell substantially to the midline. At the midline there was no difference in group participation rates between the SED and the inner buffer domain.

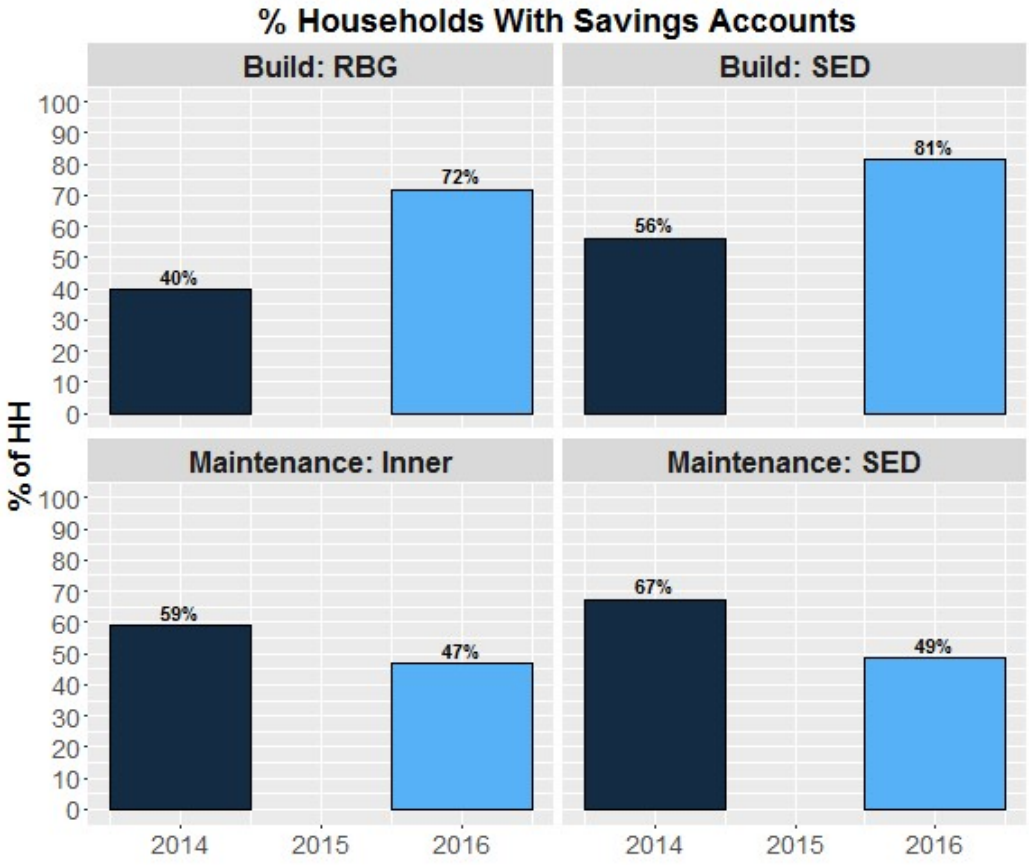
Table 48: Training received

Domain	Baseline – Any Training Received in past 12 months	Midline – Any Training Received in past 12 months
Build – SED	23%	8%
Build – RBG	20%	6%
Maintenance – SED	35%	17%
Maintenance – Inner	23%	10%

In the build areas, very few households indicated that they had received any formal training in the past 12 months at the midline survey. SED households were slightly more likely than RBG households to have received training at both the baseline and midline surveys.

The maintenance area SED households were significantly more likely to have indicated that they received some form of training in the past 12 months than the inner buffer households. The same was true at the midline, although the proportions of households indicating this fell substantially between the two surveys across both domains.

Figure 96: % households with savings accounts



In the build area, the SED domain was more likely than the RBG domain to have a savings account at both surveys. At the midline, 81% of households in the SED domain had a savings account compared with just 72% of the RBG domain. Theoretically 100% of households in these domains should have savings accounts, but there is some evidence to suggest that the SED households were more likely to have maintained this savings account than the RBG only households.

Among savers the amount in their savings account started from a similar level at the baseline survey (1800 NPR for SED and 2000 NPR for RBG) but increased by more for the RBG domain on average than the SED domain. The SED median at the midline was 7150 NPR compared with the RBG median of 9250 NPR. So although more SED households had savings accounts, those that did had, on average, smaller amounts saved than the RBG.

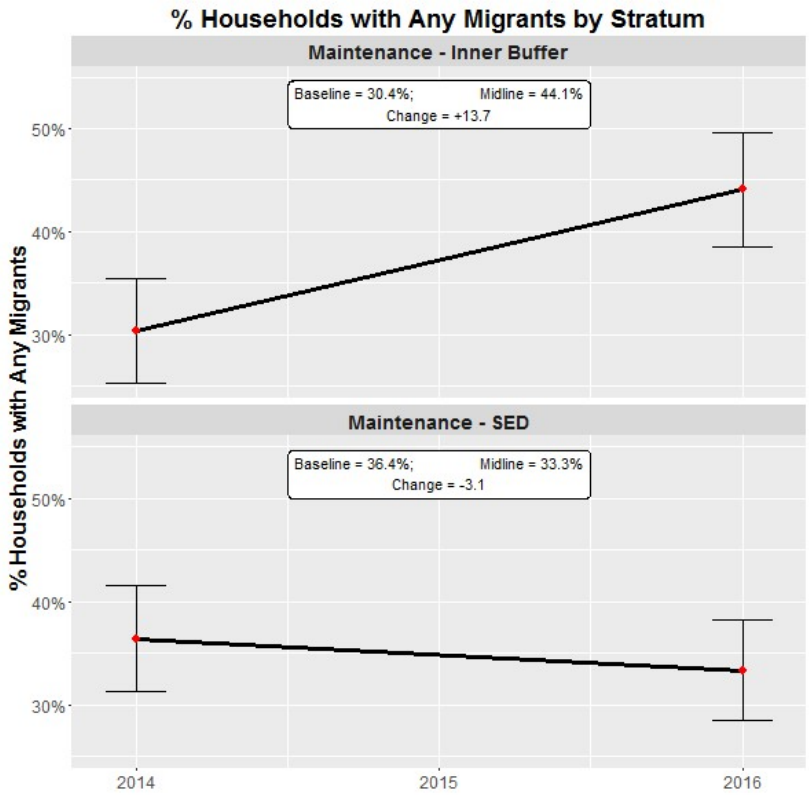
At the baseline there were more SED households in the maintenance districts with savings accounts than in the inner buffer domain. Savings accounts decreased in both domains up to the midline, and there was very little difference in frequency of savings account ownership (47% for inner domain; 49% for SED domain). At the baseline savers had an average of 2000 NPR saved in both of the domains.

The average amount saved increased slightly in both domains, by a fairly consistent amount. The medians increased up to 3500 NPR for the SED domain and 3600 NPR for the inner domain.

Table 49: Change in value of median savings for those with savings

Domain	Baseline – Median Savings Amount (Savers Only) NPR	Midline – Median Savings Amount (Savers Only) NPR
Build – SED	1800	7150
Build – RBG	2000	9250
Maintenance – SED	2000	3500
Maintenance – Inner	2000	3600

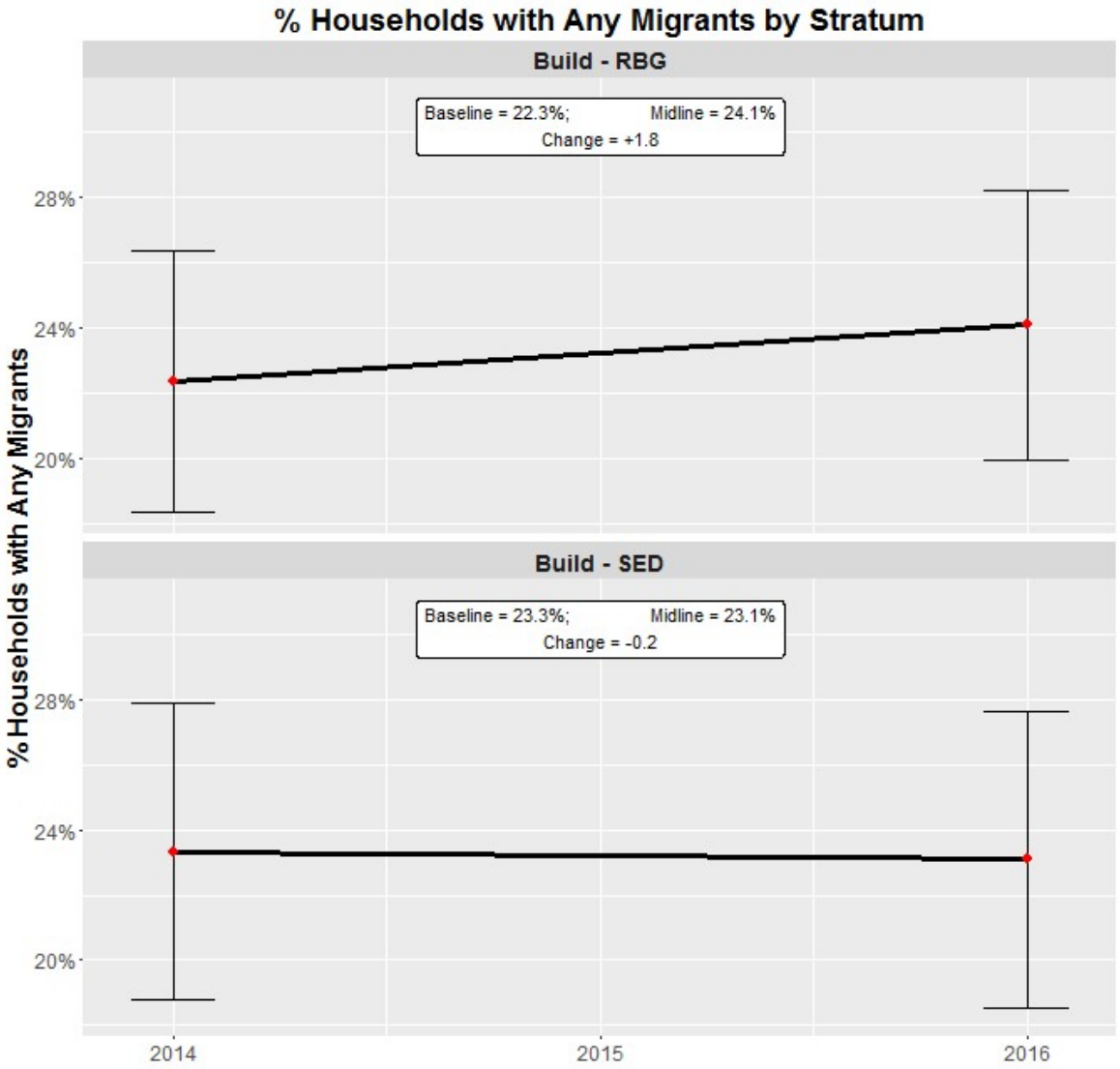
Figure 97: % households with any migrants (maintenance districts)



Migration from within the SED domain in the maintenance areas fell slightly between baseline and midline, from 36% of households having at least one migrant member to 33% of households. This contrasts sharply with the inner buffer maintenance domain where migration increased substantially, from 30% of households to 44%.

Migration in the RBG and build SED domains did not change substantially between the baseline and endline and there was no evidence of any differences between the domains. The SED domain rate stayed unchanged at 23% whilst the rate for RBG households increased slightly from 22% to 24%.

Figure 98: % households with any migrants (build districts)

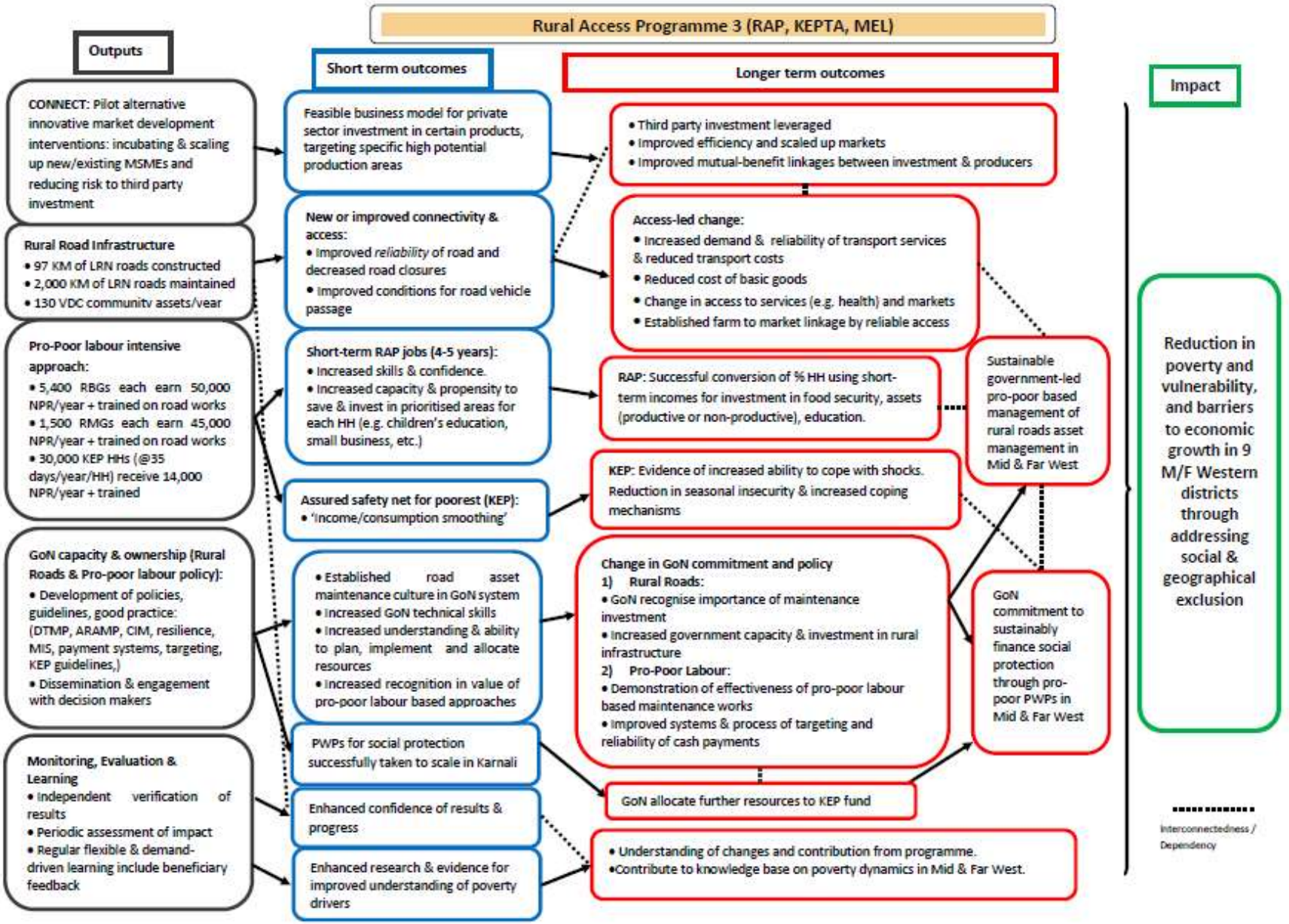


Annex 1: RAP3 Theory of Change: Extracted from the MEL Framework

The diagram overleaf illustrates the Theory of Change to complement the narrative [in the Framework document]. It does *not* contain an exhaustive list of possibilities, but focuses on the main ones. This is much broader than the level of detail expected in a logframe (and other documents sources). Many of these are not stated objectives of RAP but are logical areas where broader impact can be expected.

Working from left to right there is a flow of columns:

1. The **activities** summarise the interventions that will be undertaken under RAP3.
2. The **outputs** are the direct results of the activities. These should be readily observable and measurable. The RAP3 monitoring and Management Information System (MIS) will monitor progress against these. The MEL unit will provide process monitoring and verification against samples of work.
3. The **intermediate outcomes** follow from the outputs and represent the wider benefits generated by RAP3, albeit with a greater degree of attribution and a shorter time to achievement than the long-term outcomes. Whilst the RAP3 team will be able to provide information on some outcome areas, the responsibility for measurement of results from this level and beyond lies increasingly with the MEL unit.
4. The **long-term outcomes** of RAP3 are likely to take several years to come about, and are characterised by being much broader and less easily attributable to the programme itself than previous stages in the Theory of Change. Broader, systemic changes are more likely to be observed at this level. By this stage, the evaluation is primarily about estimating RAP3's *contribution* to discernible change observed over time in the broader developmental context of western Nepal.
5. The **impact** level is the highest level of the Theory of Change, and is the end goal of intervention – sustainable, inclusive poverty reduction. At this level, the degree of attribution to RAP3 for any observed changes are likely to be extremely narrow, with a great multitude of factors feeding in to the determination of poverty levels in the region. What is more, the full impacts of RAP3 interventions are likely to take many years to feed through.


Rural Access Programme 3 (RAP, KEPTA, MEL)
Outputs
Short term outcomes
Longer term outcomes
Impact
CONNECT: Pilot alternative innovative market development interventions: incubating & scaling up new/existing MSMEs and reducing risk to third party investment
Rural Road Infrastructure
• 97 KM of LRN roads constructed
• 2,000 KM of LRN roads maintained
• 130 VDC community assets/year
Pro-Poor labour intensive approach:
• 5,400 RBGs each earn 50,000 NPR/year + trained on road works
• 1,500 RMGs each earn 45,000 NPR/year + trained on road works
• 30,000 KEP HHs (@35 days/year/HH) receive 14,000 NPR/year + trained
GoN capacity & ownership (Rural Roads & Pro-poor labour policy):
• Development of policies, guidelines, good practice: (DTMP, ARAMP, CIM, resilience, MIS, payment systems, targeting, KEP guidelines,)
• Dissemination & engagement with decision makers
Monitoring, Evaluation & Learning
• Independent verification of results
• Periodic assessment of impact
• Regular flexible & demand-driven learning include beneficiary feedback
Feasible business model for private sector investment in certain products, targeting specific high potential production areas
New or improved connectivity & access:
• Improved reliability of road and decreased road closures
• Improved conditions for road vehicle passage
Short-term RAP jobs (4-5 years):
• Increased skills & confidence.
• Increased capacity & propensity to save & invest in prioritised areas for each HH (e.g. children's education, small business, etc.)
Assured safety net for poorest (KEP):
• 'Income/consumption smoothing'
• Established road asset maintenance culture in GoN system
• Increased GoN technical skills
• Increased understanding & ability to plan, implement and allocate resources
• Increased recognition in value of pro-poor labour based approaches
PWPs for social protection successfully taken to scale in Karnali
Enhanced confidence of results & progress
Enhanced research & evidence for improved understanding of poverty drivers
• Third party investment leveraged
• Improved efficiency and scaled up markets
• Improved mutual-benefit linkages between investment & producers
Access-led change:
• Increased demand & reliability of transport services & reduced transport costs
• Reduced cost of basic goods
• Change in access to services (e.g. health) and markets
• Established farm to market linkage by reliable access
RAP: Successful conversion of % HH using short-term incomes for investment in food security, assets (productive or non-productive), education.
KEP: Evidence of increased ability to cope with shocks. Reduction in seasonal insecurity & increased coping mechanisms
Change in GoN commitment and policy
1) Rural Roads:
• GoN recognise importance of maintenance investment
• Increased government capacity & investment in rural infrastructure
2) Pro-Poor Labour:
• Demonstration of effectiveness of pro-poor labour based maintenance works
• Improved systems & process of targeting and reliability of cash payments
GoN allocate further resources to KEP fund
• Understanding of changes and contribution from programme.
•Contribute to knowledge base on poverty dynamics in Mid & Far West.
Sustainable government-led pro-poor based management of rural roads asset management in Mid & Far West
GoN commitment to sustainably finance social protection through pro-poor PWPs in Mid & Far West
Reduction in poverty and vulnerability, and barriers to economic growth in 9 M/F Western districts through addressing social & geographical exclusion
Interconnectedness / Dependency

Annex 2: Household survey methodology

1. RAP3 baseline questionnaire development

The RAP3 baseline survey was designed to give a broad estimate of the changes in poverty and wellbeing in the districts where RAP3 interventions are taking place. A number of considerations informed the design of the survey, including the need to observe any hypothesised effects of RAP3 intervention (particularly those captured in the RAP3 logframe), and our initial experience working in the relevant districts (i.e. the Reality Check Approach work).

The starting point for the baseline design, however, was the Government of Nepal's *Nepal Living Standards Survey* (NLSS).

Nepal Living Standards Survey (NLSS)

The official government source of data for estimating per capita consumption and poverty rates is the Nepal Living Standards Survey (NLSS). The NLSS is a multi-topic household survey containing information on a wide range of topics related to livelihoods and the determinants of living standards in Nepal. A considerable part of the questionnaire is taken up with detailed consumption questions that come together to create a consumption aggregate, which is in turn used to determine official poverty statistics.

The NLSS was conducted for the first time in 1995–96 (NLSS-I). Since then, two more survey rounds have been implemented – one in 1995–96 (NLSS-II), and the most recent one in 2010–11 (NLSS-III). The NLSS sampling covers the RAP3 implementation districts in the Mid- and Far-West of the country.

In developing the RAP3 baseline questionnaire, we took the NLSS-III questionnaire as a starting point, before stripping out questions that we considered surplus to our requirements and adding additional questions where necessary. This ensures definitional consistency of a good number of indicators between the RAP3 baseline and the NLSS, allowing cross comparison between the two, and potentially allowing for additional analysis to be conducted if another NLSS round is conducted in the lifetime of RAP3.

Questionnaire design considerations

A number of considerations drove the design of RAP3 baseline questionnaire following the NLSS-III starting point:

- **Logframe indicators** – the RAP3 baseline needs to capture the headline indicators of the logframe, as presented in Table 50.

Table 50: Logframe indicators

Indicator	Description
Impact 1	Number of households directly lifted out of poverty by RAP (indicator to be finalised through RAP/MEL baseline)
Impact 2	Number of households with improved Standard of Living Index (SOLI) (indicator to be developed through RAP/MEL baseline)
Outcome 1	Number of people benefitting from improved access (A) travel time and (B) cost of transportation
Outcome 2	Increased local market activity in the RAP road networks corridors (over baseline year)
Outcome 3	Number of households with reduced economic insecurity OR Number of HH with increased annual income of 10,000 NRP due in Road Transport Impact Area (RTIA) of RAP

- Other **hypothesised effects of RAP3**, as set out in Table 51.

Table 51: Hypothesised effects of RAP3 intervention

• Reduced transport cost for passengers	• Reduced distress migration
• Increased household income	• Increased non-distress migration
• Increased household income diversity	• Reduced cost of credit / greater diversity of institutions offering credit resulting in lower interest rates
• Increased added value from primary producers income	
• Improved nutritional status/food diversity	• Increased female participation in the labour force and household decision-making
• Increased school enrolment and attendance	• Increased household spending on asset creation activities
• Improved immunisation rates	• Increased non-farm employment activities
• Increased use of health facilities and other government services	• Increased use of improved agricultural technology and agriculture and livestock service centres

- An **abbreviated food consumption module**: Because the RAP3 baseline questionnaire was not attempting to construct a full consumption aggregate (as in the NLSS), the level of detail required on type, weight and cost of food consumed could be reduced. The food consumption score (FCS) methodology developed by the World Food Programme (WFP) was used as a framework to guide the construction of the food consumption module, and this module was harmonised with the corresponding module in The Nepal Food Security Monitoring System (NeKSAP) household questionnaire.[15]
- **Lessons learned from the Reality Check Approach (RCA)**: The Scoping Reality Check Approach (RCA) was conducted in November 2013 in order to allow findings to be reflected in the design of the baseline questionnaire. Two key outcomes emerged:
  - ✓ **The inclusion of a negative impact module in the household questionnaire as a result of the following summarised findings:**
    - Increasing access and purchase of poor quality snack foods (junk food) displacing more traditional and nutritious forms of cooking and consumption, increasing the need for cash.
    - Loss of portering jobs, local skills and livelihoods threatened by cheaper imported goods.
    - Increase in newcomers 'strangers' to the hill and mountain areas, making long-term hill and mountain residents feel more insecure, especially around illegal activities.
    - A breakdown in some of the taboos for the higher castes, e.g. drinking alcohol, which is more common now.
    - Increasing need for cash displacing traditional reciprocal labour arrangements.
- **Consideration of alternative approaches to measuring poverty.** These are discussed in the

[15] Collects, analyses and presents information on household food security, emerging crises, markets and nutrition from across Nepal. The NeKSAP was initially established by the WFP but is currently being institutionalised by the Government of Nepal in collaboration with the Ministry of Agriculture and Cooperatives and the National Planning Commission.

next section.

Measuring poverty

The first impact indicator of the RAP logframe is the 'number of households directly lifted out of poverty by RAP3'. This demands a measurement of household wellbeing, and a threshold below which a household is categorised as 'poor'.

As discussed above, the NLSS is the Government of Nepal's official data source for poverty statistics, and we once again intend to be consistent with NLSS definitions here. However, for resource constraint reasons, enumerating a full consumption aggregate for the RAP3 baseline, midline and endline was not feasible. Therefore, a **proxy means test** approach was adopted in order to model household consumption.

The Proxy Means Test (PMT) approach

The Proxy Means Test (PMT) approach sought to model household consumption upon a range of explanatory variables.

In order to construct the PMT model, NLSS-III was once again used as the starting point, drawing upon analysis conducted by the World Bank/Nepal Central Bureau of Statistics (WB/CBS) in 2013 that sought to calculate small area estimates of poverty across Nepal based upon NLSS-III data.[16] The WB/CBS analysis constructed three poverty models – one for Central and Eastern regions, one for the Western region, and one for the Mid- and Far-West regions, with the latter containing 240 villages in the eight RAP3 districts.

For our PMT model, the WB/CBS Mid- and Far-West model was adapted, removing coverage of the Terai, where the terrain is flatter and more fertile than the hill and mountain districts of RAP3. This left a sample of 660 villages, of which 240 fall within the RAP3 districts. Having removed the Terai, it was not believed that the remaining 420 villages outside of the RAP3 districts would create significant bias, as many of these share similar agro-ecological conditions and livelihood profiles with the RAP3 beneficiaries.

Further refinement of the model required careful selection of explanatory variables to be included in the RAP3 baseline survey. Selection of indicators was based upon the following criteria:

- Good coverage of **multiple dimensions of poverty**, which a recent World Bank paper cites as important in maximising the predictive power of the model.[17] The dimensions that were ultimately incorporated into the model were as follows: (i) demography; (ii) education and employment;
  (iii) housing; (iv) physical assets; (v) productive assets, (vi) health; and (vii) geography.
- Indicators that are **inexpensive to collect**, **easy to answer**, and **simple to verify** – these were the motivations for pursuing a PMT model rather than a comprehensive consumption aggregate, and should seek to ensure greatest value for money to DFID when conducting the survey.
- Indicators that are **strongly correlated with poverty**.
- Indicators that are **liable to change over an appropriate time period**. For example, literacy rates may not vary over the time of RAP3, but the extent to which children are tutored may well do.
- Indicators that are **not an immediate physical manifestation of improved road access**. For example, the model should not include explanatory variables that quantify time or cost travel to nearest facility or road. If the model was dominated by these access indicators, simply increasing access would change the consumption estimate of the model without any indirect

[16] Government of Nepal National Planning Commission Secretariat/Central Bureau of Statistics/World Bank (2013). *Small Area Estimation of Poverty, 2011*. April 2013.

[17] Christiansen L., Lanjow P., Luoto J. & Stifel D. Small Area Estimation-Based Prediction Methods to Track Poverty. Policy Research Working Paper 5683 World Bank Development Research Group, June 2011.

access outcomes and impacts having been observed.

Based upon these criteria, a range of possible indicators were identified, before the model was fitted using the Generalized Linear Latent and Mixed Models (GLLAMM) procedure in Stata, with random effects used to model each district. The selection of variables to be entered as fixed effects was conducted in a two-stage process. First, stepwise procedures were conducted to identify the variables that had a strong level of statistical significance within an overall model. Second, additional model terms were considered so that the ultimate model would include parameters from a variety of different domains.

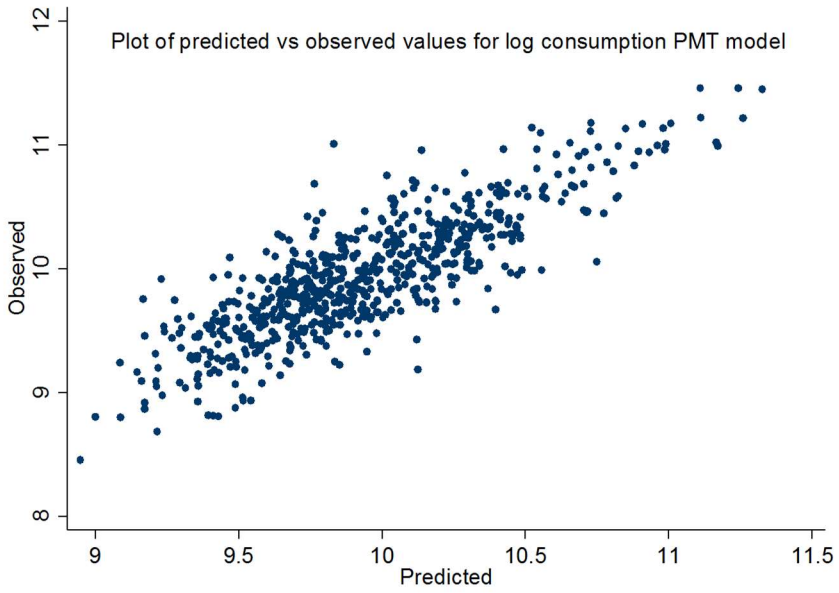
The final model is summarised below in Table 52.

Table 52: PMT explanatory variables used in final model with coefficients standard error, Z score and probability

Domains	Variable	Coef.	SE	z	P>z
Constant		10.082	0.117	86.010	<0.001
Household level variables					
Demography	Caste of Head = Dalit	-0.074	0.025	-2.970	0.003
	% of house aged <=6	-0.004	0.001	-6.590	<0.001
	% of house aged 7–15	-0.002	0.001	-3.370	0.001
	Household Size	-0.203	0.019	-10.740	<0.001
	Household Size squared	0.008	0.001	6.160	<0.001
Education and employment	Tutor used for children	0.070	0.039	1.820	0.068
	Log (Income from Employment or Sales)	0.015	0.005	3.380	0.001
	Income from Remittances	$3.31x10^{-6}$	$1.30x10^{-6}$	2.550	0.011
Housing	Number of rooms in house	0.021	0.008	2.590	0.010
	Roof is galvanised iron or concrete	0.065	0.030	2.150	0.032
	Firewood or dung as cooking fuel	-0.214	0.043	-4.940	<0.001
Physical assets	Number of assets owned	0.020	0.013	1.480	0.140
	Phone owned = Yes	0.114	0.035	3.210	0.001
	Log (Land Owned)	0.062	0.025	2.470	0.013
Productive assets	Use any improved crop varieties	0.063	0.020	3.200	0.001
Health	Food Consumption Score	0.009	0.001	12.690	<0.001
	Health facilities is perceived to be less than adequate	0.059	0.035	1.680	0.092
Village level variables					
Education & employment	Complete secondary education	0.258	0.072	3.590	<0.001
Health	Unsafe deliveries	0.189	0.022	8.560	<0.001
	Children under 24m vaccinated against measles	-0.177	0.046	-3.890	<0.001
District Random Effects (only RAP sampling districts shown)					
Geography	Achham	0.054			
	Bajura	0.054			
	Dailekh	-0.054			
	Doti	-0.164			
	Jumla	0.054			
	Kalikot	0.164			
	Mugu/Humla	0.164			

Our model has an R^2 (or *coefficient of determination*) of 0.70 – i.e. 70% of the variation in consumption in the Mid- and Far-West regions can explained by the model. This compares with a lower R^2 of 0.55 in the WB/CBS Mid and Far-West model discussed earlier. We believe this to be a particularly strong goodness of fit, as depicted in Figure 99, below.

Figure 99: Plot of annual per capita normalised household consumption against consumption predicted by PMT model



RAP3 questionnaire topics

In light of the above discussions, Table 53 sets out the finalised baseline questionnaire topics.

Table 53: Survey topics

Topic	Indicators covered
Household type utilities and amenities	Occupation type, number of rooms, construction type, access to key utilities and amenities.
Access to services and facilities	Travel type, time and cost to range of infrastructure and services, frequency of use of these infrastructure and services, reason for occasional or non-use and satisfaction perception with the service.
Food consumption	Number of days that household has consumed a range of 16 food groups.
Household assets	11 household assets enumerated, ranging from radios to jewellery.
Wage labour	Diversity of daily, long-term and contract wage labour by sector.
Non-agricultural enterprises	Diversity of non-agricultural enterprises operated by household members by sector, with length of operation and ownership

Topic	Indicators covered
	profile. Includes problems encountered running these businesses.
Agricultural land ownership and use	Number, size and type of agricultural plot including access to irrigation by season. Plot cultivation pattern for dry and wet season, revenues from sharecropping or fixed renting.
Agricultural crop diversity and cultivation in intensity	Diversity of crops cultivated in the last year, indicating where improved varieties have been planted, value of sales, intensity of agricultural fertilisers and manures.
Landholding increase / decrease	Area of land purchases and sales over the past 12 months.
Additional agricultural revenues	Income revenue from renting out draught animals and machinery, sales from wood and charcoal and non-timber forest products.
Livestock ownership	Type, value and number of livestock and numbers of sales and purchases in the last 12 months. Income from eggs, milk, meat hides and other livestock-related production.
Credit and savings	Number of loans, source and purpose of loan, principal borrowed, interest rates number, posts.
Household absentees / migration	Roster of household member absentees, reason for current absence from household, level of remittances sent in cash or in kind.
Remittances from non-members	Value and use of remittances from anybody who is not considered a household member.
Other income and savings	Diversity of receipts from in-kind transfer programmes, social protection payments and public work programmes. Saving group membership (can triangulate information from Credit and Savings section).
Household roster	Enumeration of household members, age sex and relationship to head of household.
Health	Chronic illness, disability and illness or injury in the last 30 days prevalence among household members with associated health seeking behaviour and costs. Reasons for non-consultation.
Maternity	Every married woman aged 15–49 giving birth over the last 2 years, use of pre- and post-natal services, who assisted in birth and where, with reasons for not using pre-and post-natal services.
Education	Literacy, educational attainment, current attendance, reasons for non-attendance, time

Topic	Indicators covered
	commuting to school and education expenses including private tuition.
Migration history of current household	Migration history of current household members over the past 2 years, including where they migrated to and why, reasons for return, and remittance value housing cash in kind.
Household decisions	Occurrence, involvement and final decision-making of a range of decision topics by both male and female head of household/spouse.
Adequacy of consumption and coping strategies	Adequacy of food security, housing, clothing, health care, education; food security experience in last 30 days and coping strategies employed.
Drought	Whether households had been affected, drought-specific coping strategies, impact on prices/availability of food.
Fuel crisis	Whether households had been affected, fuel specific coping strategies, impact on prices/availability of fuel.
Negative influences	Perceptions of increase or decrease in crime and insecurity, type of crime and insecurity and suggested reasons for change. Other negative changes enumerated with suggested causes. Households not aware of government service opening times and other performance factors, concerns or complaints with the services and whether respondent has voiced any complaints or grievances about the services.

Table 54: Progress out of Poverty (PPI) Scorecard for Nepal

PPI® Scorecard for Nepal

To assist with collection, organizations should use the household roster located on the second page.

Entity	Name	ID		Date (DD/MM/YY)
Participant:			Date joined:	
Field agent:			Date scored:	
Service point:			# household members:	

Indicator	Response	Points	Score
1. How many household members are there?	A. Eight or more	0	
	B. Seven	6	
	C. Six	8	
	D. Five	12	
	E. Four	19	
	F. Three	30	
	G. One or two	34	
2. In what type of job did the male head/spouse work the most hours in the past seven days?	A. No male head/spouse	0	
	B. Does not work, or paid wages on a daily basis or contract/piece-rate in agriculture	0	
	C. Paid wages on a daily basis or contract/piece-rate in non-agriculture	4	
	D. Self-employed in agriculture	5	
	E. Self-employed in non-agriculture	7	
	F. Paid wages on a long-term basis in agriculture or non-agriculture	8	
3. How many bedrooms does your residence have?	A. None	0	
	B. One	2	
	C. Two	7	
	D. Three or more	11	
4. Main construction material of outside walls?	A. Bamboo/leaves, unbaked bricks, wood, mud-bonded bricks/stones, or no outside walls	0	
	B. Cement-bonded bricks/stones, or other material	6	
5. Main material roof is made of?	A. Straw/thatch, or earth/mud	0	
	B. Tiles/slate, or other	2	
	C. Wood/planks, or galvanized iron	6	
	D. Concrete/cement	7	
6. Does your residence have a kitchen?	A. No	0	
	B. Yes	5	
7. What type of stove does your household mainly use for cooking?	A. Open fireplace, mud, kerosene stove, or other	0	
	B. Gas stove, or smokeless oven	3	
8. What type of toilet is used by your household?	A. None, household non-flush, or communal latrine	0	
	B. Household flush	6	
9. How many telephone sets/cordless/mobile does your household own?	A. None	0	
	B. One	8	
	C. Two or more	14	
10. Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, is any of it irrigated?	A. No	0	
	B. Yes, but none irrigated	3	
	C. Yes, and some irrigated	6	

By Mark Schreiner of Microfinance Risk Management L.L.C., developer of the PPI. Score:

2. Sampling and analytical domains

Having set out the design of the questionnaire, the following sections deal with the sampling methodology that led to the selection of households to be surveyed.

Panel vs cross-sectional data

A series of panel surveys (at baseline, midline and endline) are proposed instead of multiple cross-sectional surveys for the following reasons:

- The most efficient sampling for estimating change in wellbeing and other aspects of life and livelihoods over time come from repeated observations on the same respondents.
- Panel datasets reduce the burden of relisting and selecting households for each repeated survey.

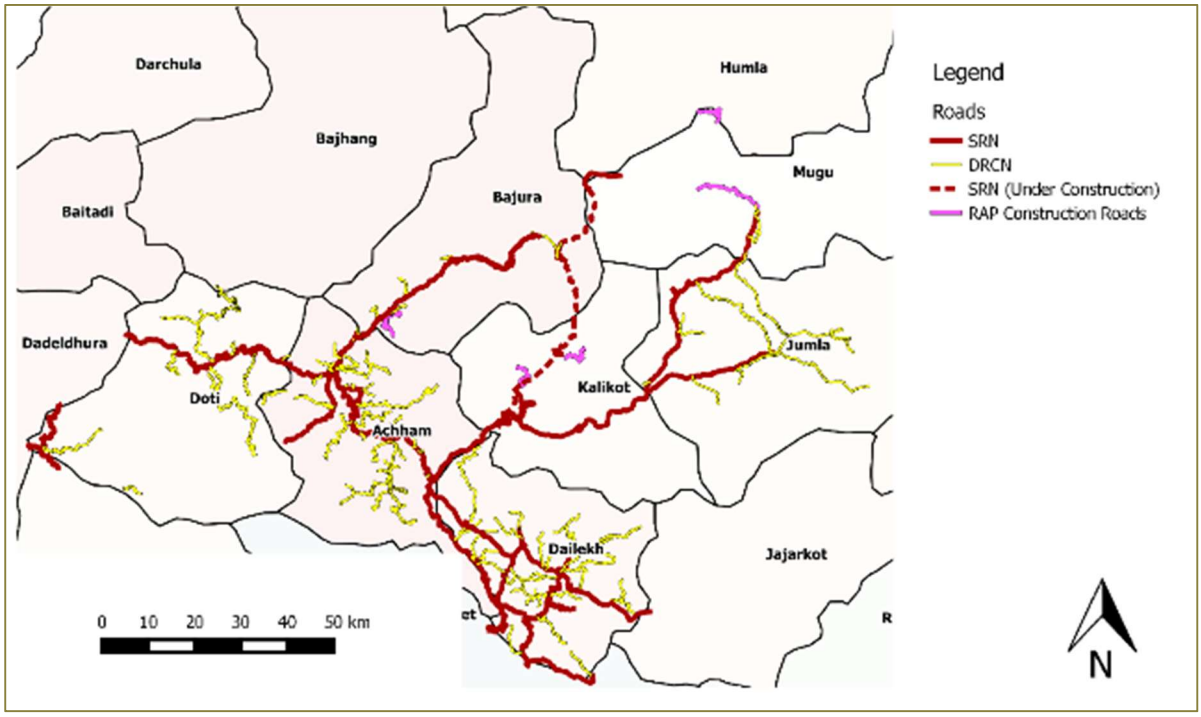
Sampling domains

RAP3 consists of two road engineering components:

1. **Road construction** in 4 districts (Humla, Mugu, Bajura & Kalikot), (coloured pink in Figure 91).
2. **Road maintenance** in 4 districts (Doti, Achham, Dailekh & Jumla), (coloured yellow in Figure 91).

Surveys will be conducted in all eight districts.

Figure 100: Map of RAP 3 construction and maintenance roads



Buffers

In order to give a richer picture of the different impacts of RAP3, 'buffer zones' were drawn up around the relevant roads, with 'inner buffers' containing direct beneficiaries within 1.5 hours' walk of a RAP3 road, and 'outer buffers' containing beneficiaries up to 5 hours' walk from the road. The latter cohorts are still expected to benefit from the roads, albeit in a more indirect manner.

In order to map these buffers spatially (and identify relevant villages within each), the walking times needed to be translated into distances. In such a mountainous area as the RAP3 implementation districts, a standard conversion of one hour walking equivalent to 4km distance is not appropriate. We therefore adjusted our calculations according to the slope of the roads (see Box 1), which can often slow movement through these districts.

In order to complete the buffer design, spatial data containing the location of existing roads and construction sites was obtained from RAP; the locations of all inhabited villages within the region were obtained from the National Geographic Information Infrastructure Programme (NGIIP),[18] and high-resolution altitude data was obtained from CIAT. Figure 2 (p10) illustrates the buffer zones within the RAP3 districts.

[18] An error in coding the GIS layers required on the part of NGIIP meant that the GIS layers for northern Doti were not supplied. Unfortunately, there was no time before a sample had to be drawn to acquire these missing shape files to ensure that there was full coverage of Doti.

Box 1: Adjusting walking time for varying gradients

Walking times across the region were estimated using the formula from Aitken 1977/Langmuir 1984 (based on Naismith's rule for walking times):

T= [(a)*(Delta S)] + [(b)*(Delta H uphill)] + [(c)*(Delta H moderate downhill)] + [(d)*(Delta H steep downhill)]

…where:

- T is time of movement in seconds,
- Delta S is the distance covered in metres,
- Delta H is the altitude difference in metres.

The a, b, c, d parameters take into account movement speed in the different conditions and are linked to:

- a: underfoot condition (a=1/walking speed)
- b: underfoot condition and cost associated to movement uphill
- c: underfoot condition and cost associated to movement moderate downhill
- d: underfoot condition and cost associated to movement steep downhill

These adjustments are based on the fact that walking downhill is preferable, but only up to a certain gradient, after which walking actually slows.

This approach is taken purely as a guide for the relative proximities of the villages to the road, rather than an actual estimate of the true walking time. There are two particular assumptions that are unlikely to hold up to scrutiny. First, the default parameters used in the model were not calibrated under the extreme conditions seen in Nepal, so can only be treated as an approximation. Second, this assumes that no factor other than the gradient will affect the walking speed; considerations are not made as to differing underfoot conditions which would slow walking pace (e.g. swamps, dense forest, etc.) or completely prohibit passage and force a diversion (e.g. private land, uncrossable rivers). It was not possible to incorporate this into the model due to a lack of reliable data on the terrain and how restrictive the differing terrains would be to movement.

RBG and SED groups

In addition to households located near the roads, the RAP3 survey also targeted the RBGs, RMGs and the SED groups. In the case of the latter, SEDs were sampled in both road building and maintenance districts.

Sampling domains

This yields eight sampling domains in total:

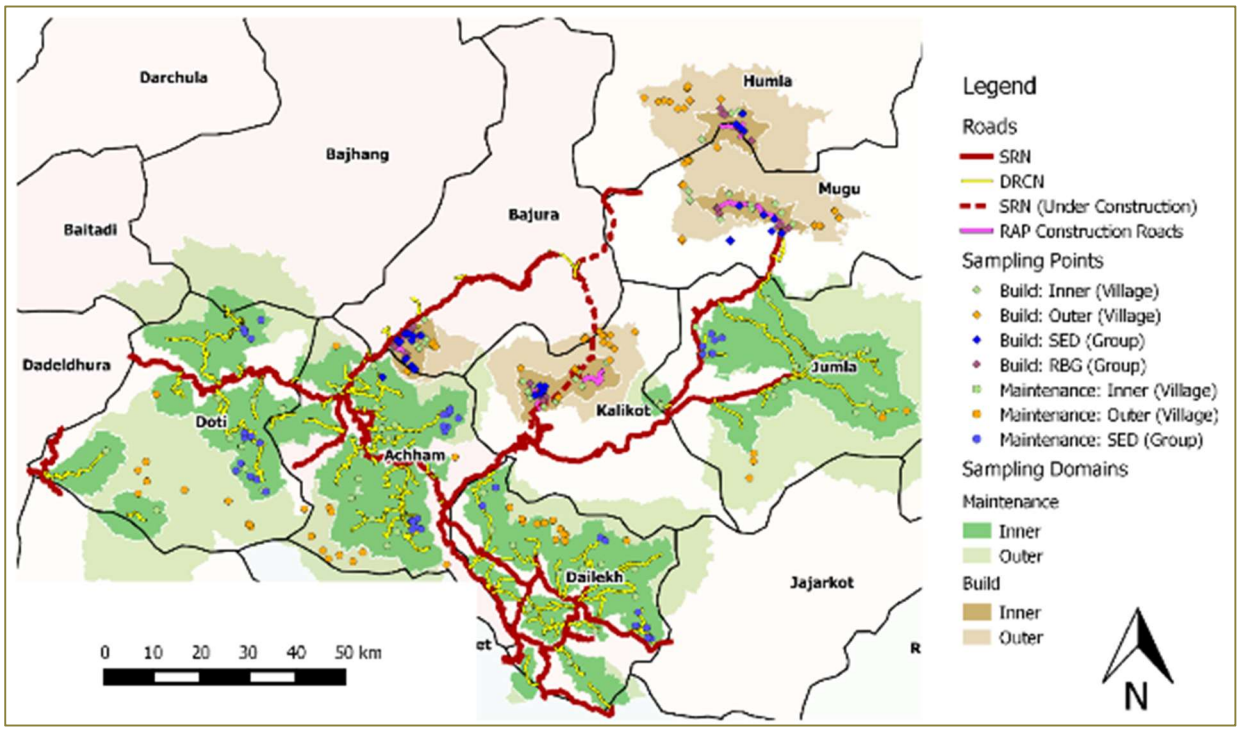
- Road building – inner buffer zone
- Road building – outer buffer zone
- Road maintenance – inner buffer zone
- Road maintenance – outer buffer zone
- SED – road building districts

- SED – road maintenance districts
- RBGs
- RMGs

The counterfactual

Given the great diversity of results expected across these eight domains, it was decided **not** to select additional control groups. Instead, comparison across the eight existing domains should yield an informative picture of the counterfactual scenario.

Figure 101: RAP3 sampling domains



Sample selection

Road building and maintenance

In the inner and outer buffers of the road building and maintenance districts the primary sample unit (PSU) is the village. For the **build** districts, 199 eligible villages were identified in the inner buffer and 251 in the outer buffer. For the **maintenance** districts, 2,769 eligible villages were identified in the inner buffer and 1,020 in the outer. From these sample frames, villages were sampled to ensure roughly equal coverage of the districts (Table 54).

Table 55: Sampling in the road building and maintenance districts

Road building domains		
District-buffer	# Villages in frame	# Villages in sample
Bajura-inner	54	12
Bajura-outer	15	9
Humla-inner	18	12
Humla-outer	89	13
Kalikot-inner	92	12
Kalikot-outer	77	13
Mugu-inner	31	12
Mugu-outer	74	13
Grand Total	450	96

Road maintenance domains		
District-buffer	# Villages in frame	# Villages in sample
Achham-inner	962	12
Achham-outer	134	12
Dailekh-inner	825	12
Dailekh-outer	31	12
Doti-inner	627	12
Doti-outer	555	12
Jumla-inner	315	12
Jumla-outer	26	12
Grand Total	3789	96

RBG and SED groups

For the RBG and SED groups, the groups themselves were the PSUs. The sample frames were constructed from registration lists of road building group (RBG) members and social and economic development (SED) members.

Table 56: RBG/SED sampling

RBGs		
Domain	Groups	Sample
Bajura-RBG	64	14
Humla-RBG	45	9
Kalikot-RBG	54	10
Mugu-RBG	55	12
Grand Total	218	45

SEDs (Build)		
Domain	Groups	Sample
Bajura-SED_Build	38	19
Humla-SED_Build	7	4
Kalikot-SED_Build	14	5
Mugu-SED_Build	21	10
Grand Total	80	38

SEDs (Maintenance)		
Domain	Groups	Sample
Achham-SED_Maintain	72	14
Dailekh-SED_Maintain	57	9
Doti-SED_Maintain	69	14
Jumla-SED_Maintain	34	8
Grand Total	232	45

In the case of the RBG groups, most consist of around 20 members (with some exceptions). The sizes of the SED groups are more variable, with an average of 23 members, but with variation from 5 to 61 members across all groups. Members of a single RBG or SED group were not always drawn from a single ward, hence the group sampling frame was constructed with RBG and SED groups as PSUs. From these sample frames, samples were selected proportional to the size of the groups (Table 55).

There was no sampling undertaken in the RMG domain – the baseline survey consisted of a census of all RMG group members at the time of the baseline survey. However, the RMG members were not able to be surveyed in 2014 at the same time as the other seven domains, as had been originally planned. At the time of baseline enumeration RMG activities had not yet started and the potential

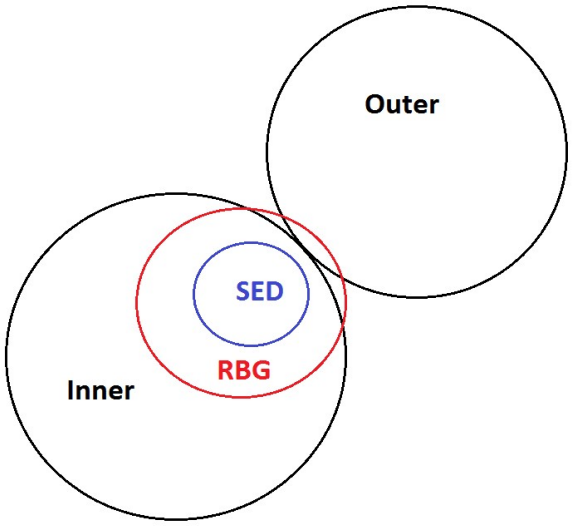
members of the RMG had not been fully identified. As a result, the RMG baseline survey took place separately from the other baseline surveys, in April-May 2015. By this time RMG activities had been running for several months, the exact length of time varied depending on the group, so the survey cannot be seen as a true baseline of the households before the intervention.

RMGs		
Domain	Groups	Sample
Achham	22	22
Dailekh	14	14
Doti	11	11
Jumla	9	9
Grand Total	56	56

This methodology for the selection of households necessarily meant that there would be overlaps where households could be eligible for multiple domains.
Within the build areas:

- The inner and outer sampling domains are completely distinct from each other.
- The RBG households predominantly live within the inner buffer, so would be eligible for selection under this sampling domain. A small number of RBG households live within the outer buffer, or within areas outside of these buffer zones. Many, but not all, of the RBG households are also SED households. The population of the inner buffer area is fairly small, and the number of people employed within the RBG relative to this population is large, so the inner buffer sample will contain a reasonably large number of RBG members.
- The SED households represent a subset of the RBG households, entirely based within the inner buffer areas. This is because SED activities were targeted to RBG households within the areas closest to the road building activities.

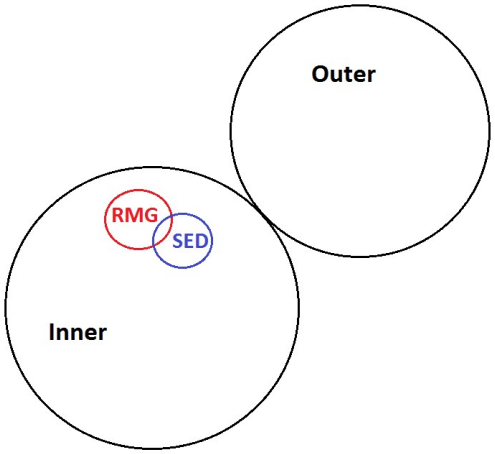
Figure 102: Theoretical overlap between build area domains



Within the maintenance areas:

- The inner and outer sampling domains are completely distinct from each other.
- The RMG households exclusively live within the inner buffer, so would be eligible for selection under the inner buffer. However, the population of the inner buffer relative to the number of people employed within the RMG means that there is a much smaller probability of selecting RMG households through the inner buffer.
- The SED households represent a subset of the inner buffer area. SED activities were targeted to former RBG households from RAP II within the areas closest to the road building activities. There is some overlap between RMG and maintenance SED, but only a small amount.

Figure 103: Theoretical overlap between maintenance area domains



The number of RMG/RBG members appearing within the other domains is summarised in Table 2 (p.10)

SED activities are not explicitly advertised as such to households participating within them, therefore it is not possible to determine the exact number of SED households appearing within the inner buffers and RBG/RMG domains.

Estimation of number of households per domain

Design effect estimation

The design effect was estimated based upon NLSS-III design effects relating to estimates of the poverty headcount rate, depth of poverty and depth of poverty squared in the mountain and hill areas of the Mid- and Far-West regions. All design effects in NLSS-III were less than two. However, due to a relatively small sample size in the RAP3 districts under NLSS-III, we are assuming a conservative design effect value of two.

Offsetting the design effect is the correlation between the same unit observed on two occasions. This was estimated at 0.5, due to the decision to use panel data described above.

Panel household attrition rate

As it is a panel sample and households will be returned to for the midline and endline enumerations, loss of households to the panel must be anticipated. Attrition rates of approximately 20% between

survey rounds have been encountered in other surveys, although Nepal-specific attrition rates are not known.

This attrition rate should be anticipated to occur twice, baseline–midline and midline–endline, giving an attrition multiplier of 1/(.8*.8)= 1.56 (this implies that the minimal sample size should be multiplied by 1.56 for the baseline survey in order to arrive at the minimal sample size by the endline, after two rounds of lost households).

Number of households per cluster

NLSS-III used 12 households per PSU. For the enumeration of the RAP baseline, 10 households per PSU were chosen in order to insulate against design effects and ensure a good geographic spread within the sample domains.

Sample size calculation and resource constraints

A minimal sample size per domain of 590 households – or 4,130 households in total – was estimated based upon the considerations described above, and summarised in Table 56, below.

Table 57: Minimum sample size calculations

Acceptable margin of error (width of the confidence limits)	+/- 5% points
Required confidence level true value falls within confidence level	95%
Poverty headcount prevalence rate	0.5
Design effect	2
Correlation between two repeated observations	0.5
Sample size required	383
Sample size multiplier to account for panel household attrition rate x2 survey rounds	1.5625
Households per sampling domain	590
Total households (7 domains)	4,130

However, the resource envelope available for the survey only allowed for the enumeration of an estimated 3,000 households per survey round. These resource constraints were accordingly factored in to the final sampling exercise.

In order to achieve similarly robust results to the original sampling calculations in Table 56, the panel attrition rate would have to fall to 13%, rather than 20%. This is less than ideal, but the use of ODK mobile phone data collection platform enables every household to be easily geo-referenced, photographed and telephone number collected (where the respondent does not object to sharing their telephone number). The historical attrition rate used in the sample size calculations above comes from household surveys where geo-referencing of individual households was not undertaken. It is therefore hoped that the extra geographic information collected on households enumerated in the baseline will reduce attrition rates so that the core sample is not significantly eroded, and an attrition rate closer to 13% can be achieved.

Midline enumeration

Table 57 shows the actual baseline enumeration rates, compared with the expected number of households based upon the earlier calculations. The overall attrition rate in the survey was 10%, below the hypothesised rate of 13%. However, the attrition of households was not uniformly split across the eight domains. The attrition rates were slightly higher than hypothesised within the SED build, outer maintenance and SED maintenance domains but lower than hypothesised within the other 5 domains.

Table 58: Midline enumeration

Sampling domain	Baseline HH	Midline HH	Attrition rate	Confirmed to have migrated		Unable to locate/duplicate household	Refused consent	Midline HH Phone*
				Within RAP Districts	Other			
RBG	447	414	7%	1	10	19	3	7
Build inner	462	420	9%	9	14	15	4	6
Build outer	498	476	4%	4	10	6	2	2
SED build	382	330	14%	6	10	31	5	9
RMG	423	385	9%	1	14	21	3	8
Maintain inner	543	501	8%	2	10	30	0	7
Maintain outer	407	349	14%	3	11	43	1	8
SED maintain	450	380	16%	3	14	43	10	10
Grand Total	3,622	3,255	10%	29	93	208	28	57

* These households are a mixture of those who had migrated and those who could not be located during the time when the enumerators were present in the communities.

When following up with some households it was found that the same households had been interviewed more than once in the baseline survey, in most cases as part of different stratum. This was largely because the RBG, RMG, and SED members were all eligible for selection as part of the sample inner and outer buffers.

A subset of questions predominantly focused on migration was asked over the phone to households who could not be located in person but could be reached.

Construction of weights

Weights were calculated for 7 of the 8 domains, based on the household sampling probabilities. These estimates are essential for the construction of household weights for the inner and outer sampling domains in the build and maintenance districts. Without them the un-weighted analysis will include bias arising from the following:

1. The number of households in each of the villages in the sample frame was unknown and therefore selection of villages could not be done proportional to the size of that village. To get an estimate of the selection probability of a household within a given village, it is essential to have the number of households resident in each of the villages sampled.

2. The original sampling of villages across four districts for either the inner or outer buffers was to be unconstrained in terms of the number of villages to be selected from each district. Once the village sample frame was constructed and initial sampling procedures run, it became apparent that some zones in some districts were under-represented or excluded completely, as some outer buffers have very few villages in them. It was therefore decided to ensure a similar number of households would be enumerated in each of the zones in each of the districts. To achieve this, different sampling intensities were calculated for each of the buffers within a given district, meaning that the un-weighted analysis reported for the build or maintenance district inner or outer buffer domains will be biased in favour of those buffers in districts that have small numbers of villages.

For the RBG and SED groups the sample frame was based on theoretically complete listings of RBG and SED group membership immediately prior to the baseline survey. Therefore household weights have been calculated, and the selection of groups within strata was proportional to size of the group. There are no weights calculated for the RMG domain because the survey was conducted on a census of member households – therefore the weights are 1 by definition.

Seasonality

The urgency to enumerate the RAP3 baseline before implementation activities started meant that it was not possible to conduct an extended enumeration over a 12-month period, which would have helped to neutralise variations in consumption throughout the year. Therefore it must be recognised that this baseline – enumerated between 3 May and 8 June 2014 – should be enumerated at the same time of year for the midline and endline surveys in order to neutralise seasonality distortions between the survey rounds.

Annex 3: Reality Check Approach

Important characteristics of the RCA are:

- ***living*** with rather than visiting (thereby meeting the family in their own environment, understanding family dynamics, how days and nights are spent, etc.).
- ***conversations*** rather than interviews (there is no note taking, thereby putting people at ease and on an equal footing with the outsider).
- ***learning*** rather than finding out (suspending judgement, letting people who experience poverty take the lead in defining the agenda and what is important).
- ***household-centred***, interacting with families rather than users, communities, and groups.
- ***experiential*** - in that researchers themselves take part in daily activities (collecting water, cooking, cultivation) and accompany household members (to school, to market).
- ***inclusion*** of all members of households.
- ***private*** space rather than public space disclosure (an emphasis on normal, ordinary lives).
- ***multiple realities*** rather than public consensus (gathering diversity of opinion, including 'smaller voices').
- ***ordinary interaction*** with front line service providers (accompanying host household members in their interactions with local service providers, meeting service providers as they go about their usual routines).
- ***cross-sectoral*** **-** although each RCA may have a special focus, the enquiry is situated within the context of everyday life rather than simply (and arguably artificially) looking at one aspect of people's lives.
- ***longitudinal*** change - understanding how change happens over time.

Study location selection

The RCA study villages were selected purposively to illustrate different elements of the RAP3 project. Two districts represented ‘new’ areas where new road construction is planned (Humla and Bajura) while two other districts were old RAP1 and 2 areas where the emphasis is to ensure improved maintenance with small amount of upgrade work (Achham and Doti). The locations were selected using the same criteria as the quantitative survey. Purposive sampling resulted in study villages being selected along the road corridor and within 1.5 hours walk of the road corridor. Social and economic development (SED) is planned for all areas.

Table 58 provides information on the study locations with remoteness and type of RAP intervention key determinants for selection. The poverty scale on the left of the table was not pre-determined but has been assessed post-study based on study observations. This ranking was made based on the study team’s assessment of predominantly public poverty. It represents an assessment of access to services, perceived quality of services, remoteness, income diversity and extent of economic activity in the vicinity as well as levels of social capital. Four teams of researchers comprising members from each study location developed their own matrices to compare and rank these aspects of poverty and developed their own priority rankings which were then combined to produce the final ranking noted in this and subsequent tables. The locations are listed in this order to provide the reader with some pointers to interpreting findings.

The villages are not named in order to protect the identity, anonymity and confidentiality of participants in what is intended to be a longitudinal study.

Table 59: Study locations

Poverty	VILLAGE CODE	LOCATION	REMOTENESS	ETHNIC MIX	RAP intervention
poorest	C	Humla	3.5 days trek from district town	Brahmin and Chettri (few Dalits live segregated) Settlement= 64 HH across 4 wards)	New road – just started
	D1	Doti	2 hours walk from district town. RAP road access (1.5 hours)	Chettri and Brahmin with about 20% Dalit Settlement= 90HH across 2 wards	RAP road built 10 years ago. Road upgrade planned
	B1	Bajura	1.5 hours from sub district town but difficult access to VDC	All Chettri Settlement= 161 across 3 wards	New road – just started
	A	Achham	Along main road, thriving market area & growth centre for 6 VDCs. Some hamlets up to one hour walk to this sub district town.	Chettri majority – 20–40% Dalit – some hamlets Dalit majority. Settlement=160HH across 2 wards	RAP road built 5 years ago. Road upgrade, maintenance
	B2	Bajura	7 hours walk from sub district town	Predominantly Brahmins Settlement= 75 HH across 2 wards	New road – just started
Least poor	D2	Doti	Small market town with VDC office and other government offices, 3 hours walk to district town.	Chettri & Brahmins majority in most villages. Some with equal number of Dalits. Settlement= 200HH across 3 wards	RAP road built 10 years ago. Road upgrade planned

A total of 24 host households were included in the Baseline Study, most of which were regarded in the village as comparatively poorer. A further 100 focal or neighbouring households were also included. Approximately 900 participants were included in conversations over the four-day/four-night periods that the researcher stayed in the homes of people living in poverty in each location. More than 1,300 hours of interaction (equivalent to more than 250 focus group discussions).