

REPUBLIC OF RWANDA



NATIONAL INSTITUTE OF STATISTICS OF RWANDA



# EICV<sub>3</sub> THEMATIC REPORT

## Environment & Natural Resources

**DFID** Department for International Development





## Foreword

The 2010/11 Integrated Household Living Conditions Survey, EICV3 (Enquête Intégrale sur les Conditions de Vie des Ménages), is the third in the series of surveys which started in 2000/01 and is designed to monitor poverty and living conditions. The survey fieldwork commenced in November 2010 and continued for one full year. In 2010/11, for the first time the achieved sample size of 14,308 households in the EICV3 was sufficient to provide estimates which are reliable at the level of the district.

To date, two publications have been issued by the National Institute of Statistics of Rwanda (NISR) using EICV3 data: a report with an overview of main indicators and a poverty profile. The present report is one of a series of 10 further documents that each explores in depth a theme from the Economic Development and Poverty Reduction Strategy (EDPRS) using data from EICV3 and a limited number of other sources. The objective is to provide analysis that will contribute to the understanding of the sector and to support the elaboration of Rwanda's Second EDPRS.

The 10 thematic reports in this series are: (i) Economic Activity; (ii) Utilities and Amenities (water/sanitation/energy/housing/transport/ICT); (iii) Social Protection; (iv) Environment and Natural Resources; (v) Consumption; (vi) Gender; (vii) Youth; (viii) Education; (ix) Agriculture; and (x) Income.

This report also draws on information contained in the Labour Market and Economic Trends in Rwanda report from August 2007, which reported on the EICV2 survey, and the Establishment Census of 2011. The report also includes some text from the Main Indicators Report of the EICV3 and makes some revisions to the data published there as result of deeper analysis of the data.



**Yusuf MURANGWA**

Director General

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We appreciate the valuable support provided by administrative and financial departments of the NISR. Their interventions allowed this survey data analysis to be carried out smoothly and under good conditions.



## Methodological notes for readers

### *Urban and rural classification in the EICV3 data*

Although the sampling frame for the EICV3 was based on an updated frame of villages, the urban and rural classification of the villages in the EICV3 data is based on the corresponding geographic designations from the 2002 Rwanda Census of Population and Housing. Since the EICV2 sample design was based on the sampling frame from the 2002 census, this urban/rural classification in the EICV3 data makes it possible to directly compare the urban and rural results from the EICV2 and EICV3 data. However, the urban/rural codes in the EICV3 data do not represent the current status of these villages, so it is important that users understand how to interpret the urban and rural results from the data. For example, since the urban classification was mapped directly from the 2002 geographic structure of Rwanda, the estimated total urban population from the survey data will not represent the expected urban expansion of the population. It is even possible that the estimate of the percentage of the population that is urban from the EICV3 data is slightly less than that from the EICV2 data because of sampling variability.

The initial urban/rural classification of the villages in the EICV3 sampling frame was determined at the level of the old sectors. In the 2002 Rwanda census frame, 1,545 sectors were defined for Rwanda. Under the new geographic structure these were reconfigured into 416 new sectors. Each of the 2002 sectors was classified as either urban or rural, and all the zones de dénombrement within the sector were given the corresponding urban/rural code. A spreadsheet was compiled showing the geographic correspondence between the 2002 sectors and the current sectors. When all the old sectors corresponding to a new sector were either urban or rural, the corresponding classification was assigned to all the villages in this sector. However, in the case of new sectors that are composed of both urban and rural old sectors, the villages were assigned a code of 3 for 'mixed'. The EICV3 sampling frame of villages for each district was ordered by urban, mixed and rural classifications in order to provide implicit stratification and a proportional allocation of the sample to each of these groups. For EICV3, there were 106 sample villages in new sectors classified as mixed, for which it was necessary to have a special cartographic operation to determine the urban/rural classification. The file with the GPS coordinates of each EICV3 sample village was used to pinpoint the exact old sector where the village was located. In this way it was possible to obtain the 2002 urban/rural classification for all the villages in the EICV3 sample.

The NISR is currently updating the urban and rural classification of all villages in preparation for the 2012 Rwanda census. Once these urban/rural codes have been finalised, it will be possible to merge these codes into the EICV3 data file so that the sample can be post-stratified and tabulated by the current urban and rural classification. This will not affect the weights in the survey data, which are based on the probabilities of selection. It is important to tabulate the urban and rural results using the new codes in order to represent the current distribution of the population and their characteristics (for the reference period of EICV3). However, the 2002 urban/rural codes should also be kept in the EICV3 data file for comparing the results to EICV2.

### *Estimates at the provincial urban/rural level*

Readers should be aware that the urban component of the rural provinces is very small, as is the rural component of Kigali City. Estimates are not presented for these provincial urban and rural domains as they would be affected by large sampling errors.

Readers are recommended to check carefully the sampling errors presented in the annexes.

The tables below show the unweighted sample sizes at provincial level for urban and rural domains.

EICV3	Urban/rural		Total
	Urban	Rural	
Kigali City	1,177	171	1,348
Southern Province	492	3,348	3,840
Western Province	204	3,156	3,360
Northern Province	132	2,268	2,400
Eastern Province	144	3,216	3,360
Total	2,149	12,159	14,308

EICV2	Urban/rural		Total
	Urban	Rural	
Kigali City	954	72	1,026
Southern Province	279	1,428	1,707
Western Province	153	1,500	1,653
Northern Province	135	924	1,059
Eastern Province	99	1,356	1,455
Total	1,620	5,280	6,900

### *Quintiles and poverty classifications*

The results are presented by quintile. Quintiles are developed by sorting the sample of households by annual consumption values, and then dividing the population into five equal shares. The 20% of individuals with the highest annual consumption are allocated to quintile 5, and the 20% of individuals with the lowest levels of annual consumption are allocated to quintile 1. The poorest households and their members are found in quintile 1 and the richest are found in quintile 5. Those around the poverty line are found in quintile 3.

Consumption is used as a proxy for income, as is usual when estimating poverty. The reader should refer to the report on the Evolution of Poverty in Rwanda from 2000 to 2011 for further information on this topic.

## Executive summary

On 7 February 2012, the President of Rwanda officially launched the design phase of the EDPRS2. A key input into the development of the EDPRS2 is the evidence collected through the EICV3, fieldwork for which was carried out by the NISR between November 2010 and November 2011. The NISR will release a series of 10 reports that explore in depth 10 different topics that are of high importance to the elaboration of EDPRS2.

This report is one of these 10 thematic reports that seek to inform and support the development of the EDPRS2 with data from the EICV3. It focuses on the environment and natural resources sector, providing detailed insights into the living conditions of the Rwandan population with regard to these themes.

This report explores a wealth of evidence collected through the EICV3 and complements it with further data sources (e.g. EICV2 and sector documents) in order to put this new evidence into a meaningful context. It also makes use of the fact that the EICV in its third round achieved for the first time a sample size that is sufficient to provide estimates that are reliable at the level of the district.

The report discusses first the interactions between a growing population in Rwanda and their human settlements with the environment. It then presents information on the natural resources that allow Rwandan households to maintain and develop their standard of living. Finally, it discusses potential threats resulting from the environment and its deterioration.

### *Population growth and the environment*

Rwanda has a fast-growing population which totalled almost 11 million people in 2011. There is no question that population growth can contribute to environmental degradation, because it puts increased pressure on the assimilative capacity of the environment. The population of Rwanda is projected to increase to almost 14 million people by 2020. In addition to the overall population growth, population density is a crucial indicator in relation to the environment. This is especially true in the case of Rwanda, which is one of the most densely populated countries both in Africa and the world. The current density levels are already regarded as a major driver of internal migration as well as stress to the physical environment, and density is bound to further increase. However, fertility declined strongly in Rwanda in recent years.

Population growth can contribute to environmental degradation. However, these effects can be mitigated through modern technologies or awareness programmes. 97% of households stated they received some sort of environmental information, and meetings as well as radio broadcasts were the main means of receiving such information.

### *Human settlement and waste management*

The impact of humans on environmental degradation can be mitigated by modern technologies (e.g. integrated pest management in agriculture or recycling/composting in waste management), but equally so by simple behavioural patterns such as the proper treatment of waste or use of sustainable fuels. Traditionally, rural habitat in Rwanda has been made up of scattered and isolated dwellings. Such settlements make it difficult to develop accessible rural infrastructure and provide basic services

for sustainable use of natural resources and treatment of the environment. However, the data show a clear trend away from the traditional isolated habitat towards *Imidugudu* or other clustered forms of habitat.

The trend towards modern and clustered settlements, in combination with labour migration and other factors, has led to a very high degree of mobility among the Rwandan population over the last few years. Almost half of Kigali residents have only lived in their current dwelling for less than five years, and even in other provinces many households have only moved into their current dwelling in the past five years. Nevertheless, despite these strong changes in habitat, isolated rural dwellings are still the most common form of housing for the poorest quintile.

Households that live in modern or planned settlements tend to be provided with better management of waste and sewage. The trends in habitat type are thus accompanied by improvements in waste management. In urban areas, provision of refuse collection services has increased from 23 to 30%, and use of compost heaps has increased in rural areas from 60 to 64%. These are, however, modest changes and indicate that sustainable waste management is still not a priority for many households.

In addition to solid waste management discussed above, the disposal of liquid wastes through improved sanitation facilities is also an important factor in preventing environmental damage. The percentage of households with access to improved sanitation has increased considerably over the past five years in Rwanda, from 59 to 75%.

Considerable improvements can also be observed in construction materials used for dwellings, e.g. the increase in households with cement floors (13 to 17%), the growing trend of using bricks for walls rather than tree trunks (households using bricks increased from 45 to 57%), or the switching from thatched roofs to metal sheets (metal sheet usage increased from 44 to 54%).

### *Energy resources*

Use of fuels can be a major strain on the environment. On the other hand, fuels are an essential day-to-day environmental resource allowing Rwandan households to maintain and improve their standard of living. Hence, a balance must be found between an energy supply that ensures economic development but makes sustainable use of natural resources in the long run.

Firewood is still the fuel used for cooking by the vast majority of the rural population (93%). In the cities, charcoal is used by 51% of households, followed by firewood (45%). While rural households have not changed the fuels they use for cooking in the last five years, a slow trend can be observed in the cities away from firewood and toward charcoal.

The percentage of households connected to electricity has increased substantially over the last five years, especially in the cities (23 to 46%). Overall, it changed from 4 to 11%. 'Green' energy sources such as solar power or biogas play a negligible role in household energy use in Rwanda.

Private ownership of motorised vehicles is another source of demand for fuels, but this is still very low in Rwanda. Commercial/industrial use of fuels constitutes a further source of energy demand, and this is sure to increase in the coming years.



## *Water resources*

In addition to energy, another essential natural resource for human survival and development is water. In general, access to safe drinking water has a direct impact on the population's quality of life, health, and productivity.

Access to improved drinking water sources has increased in Rwanda, from 70 to 74%. Kigali City has the largest percentage of households using an improved drinking water source (83%) with 33% having water piped into their premises. The proportion of households using surface water (rivers or lakes) as drinking water has decreased from 18 to 12%. Rural households can now reach an improved water source more quickly than they could five years ago.

Expenditure on water constitutes only a negligible proportion of household expenditure (less than 1%). However, there is a clear trend that fewer households receive their water for free when compared to five years earlier (from 81 to 69%).

## *Land management and agricultural practices*

Land is one of the three main factors of production and its finite nature makes it a very valuable natural resource. Use and management need to be carried out in a sustainable and rational manner. Given a growing population combined with strong reliance on agriculture, land is one of the scarcest natural resources in Rwanda.

The average area cultivated per rural household is only 0.6ha. The Food and Agriculture Organisation of the United Nations (FAO) estimates that on average a Rwandan household requires at least 0.9ha to conduct sustainable agriculture. However, only 17% of rural households cultivate 0.9ha or more in Rwanda. The majority of cultivating households across all provinces have less than 0.9ha (83%), or even less than 0.3ha (46%).

With a growing population, land is becoming even scarcer over time. The average size of land cultivated per rural household has decreased in five years in all provinces except the Southern Province, where it was already lowest out of all provinces five years ago. The changes observed are: Western Province 0.6 to 0.5ha; Northern Province 0.9 to 0.5ha; and Eastern Province 1.0 to 0.8ha; Southern Province 0.6 to 0.6ha. This could suggest that the Southern Province has already reached the point at which no further land sharing is possible. In provinces other than the Southern Province, land cultivated per household has reduced between surveys, but it is now on average around 0.5ha across all provinces except Eastern Province, and this is approximately the level at which no further reduction was observed in the Southern Province over the last five years. If the assumption holds that below this level no further land sharing is possible, Rwanda might see a lot more young individuals without access to land in the Southern, Western and Northern provinces in the coming years.

One of the strategic objectives of the land sub-sector is to ensure security of land tenure. The EICV provides information on both land ownership and exposure to the Land Tenure Regularisation (LTR) process. The dynamics of land ownership changed quite considerably over the period 2005/06 to 2010/11, with ownership models diversifying and an increase in land transactions on the land market. 54% of households had been exposed to the LTR in 2010/11, and most of those were at the stage of either having a claims receipt issued or having their land registered.

84% of cultivating households have the right to sell their land or use it as a guarantee for a loan. Comparison with five years earlier shows that the proportion of households that can sell their land or use it as a guarantee has increased substantially. Among households that accessed a formal source of credit, 34% used land as collateral to obtain the loan.

Use of chemical fertiliser has increased strongly from 11 to 29%. The land area under irrigation is currently at 3%. The push towards erosion control has been successful. 78% of land is protected against soil erosion.

### *Economic dimension of the environment and natural resources sector*

The impact of the environmental sector on economic growth is difficult to assess given that linkages are usually indirect. It is safe to say that without the environment and natural resources, no economic development would be possible.

72% of working individuals above the age of 16 have their main job in agriculture. This clearly shows that the natural resource of land is an important factor in the country's economy, and this is especially true in the rural areas, where agriculture provides main jobs for 78% of the working population.

There are further sectors relating to natural resources which provide jobs for the Rwandan population, which are tourism, forestry and mining. The proportions of working individuals with main jobs in the forestry and mining sectors are very small, however, and currently these sectors do not constitute major drivers of job creation in Rwanda.

### *Human health and the environment*

As with the economic growth, the link between the environment and health is difficult to capture through official statistics since the link is not direct and often not measurable. A general overview of correlations between environment-related indicators and health complaints suggests that health problems are higher among people that use non-improved sanitation and also slightly higher among those using non-improved drinking water sources. Likewise, people using firewood have a higher incidence of health problems compared to others. However, it is important to note that this does in no way imply causality.

Data on different diseases in Rwanda are also presented. These data focus on diarrhoea, respiratory infections and malaria, all of which can be caused by unfavourable environmental conditions such as unhygienic water, air pollution, or infested swamps.

### *Major problems related to the environment*

Sometimes the environment can also be a major source of destruction, such as through floods or destructive rains. 44% of households in Rwanda have experienced some sort of impact due to environmental disasters. Most of these relate to reduction in harvests, either directly or through erosion, loss of soil fertility, destructive rains or droughts. As expected, rural households (which rely heavily on natural resources) are more vulnerable to environment-related disasters than urban households.

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## Abbreviations

ARI	Acute Respiratory Infection
EDPRS	Economic Development and Poverty Reduction Strategy
EICV	Integrated Household Living Conditions Survey (Enquête Intégrale sur les Conditions de Vie des Ménages)
FAO	Food and Agriculture Organisation of the United Nations
GHG	Greenhouse Gas
HH	Household
ICT	Information and Communications Technology
LTR	Land Tenure Regularisation
M&E	Monitoring and Evaluation
NISR	National Institute of Statistics of Rwanda
OPM	Oxford Policy Management
RDHS	Rwandan Demographic and Health Survey
REMA	Rwanda Environment Management Authority
RWF	Rwandan Franc





# 1 Introduction

On 7 February 2012, the President of Rwanda officially launched the elaboration of the EDPRS2. At the same time, the first EDPRS entered its final year of implementation 2012/13.

A key input into the elaboration of the EDPRS2 is the evidence collected through the EICV3, fieldwork for which was carried out by the NISR between November 2010 and November 2011. Two reports based on EICV3 data were released by the NISR in early 2011, a main indicators report and a report on poverty evolution in Rwanda. Following on from these initial publications, the NISR will release a series of 10 further reports that explore in depth 10 different topics that are of high importance to the elaboration of EDPRS2.

This report is one of these 10 thematic reports that seek to inform and support the development of the EDPRS2 with data from the EICV3. It focuses on the environment and natural resources sector. As mentioned in the environment sector's EDPRS self-assessment report, key environmental indicators were integrated for the first time in the EICV3.

This report explores a wealth of evidence collected through the EICV3 and complements it with further data sources (e.g. EICV2 and sector documents) in order to put this new evidence into a meaningful context. It also makes use of the fact that the EICV in its third round achieved for the first time a sample size that is sufficient to provide estimates that are reliable at the level of the district.

Following some short methodological notes in the following section, chapters 3 and 4 of this report discuss the interactions between a growing population in Rwanda and their human settlements with the environment. Chapters 5, 6, 7 and 8 present information on the natural resources that allow Rwandan households to maintain and develop their standard of living. Finally, chapters 9 and 10 discuss potential threats resulting from the environment and its deterioration. The annexes provide district-level estimates for selected indicators as well as confidence intervals.

## 2 Indicator selection, data sources and data gaps

The data available on environment and natural resources in Rwanda are manifold as well as fragmented. Given the cross-cutting nature of most environmental issues, the relevant data cover themes as far-reaching as agriculture, health, labour, exports, etc. As a result, the sector's monitoring and evaluation (M&E) framework includes a very large number of progress indicators, covering many different topics.

The overall achievements of the sector in regard to the EDPRS targets are monitored by a selection of four indicators in the EDPRS Results and Policy Matrix and two indicators from the Common Performance Assessment Framework. The Environment Joint Sector Review Report 2010/11 summarises achievements against these indicators as follows:

*Table 2.1 Sector achievements against EDPRS/CPAF performance indicators*

Indicator	Targets 2010/11	Actual performance
Proportion of registered privately owned land having women as owners or co-owners	50%	84%
% of watersheds with known water quantity	10%	7%
% of national forest cover	22.1%	22.1%
Total revenue from exports of mineral products (in million USD)	89	116.8
Number of land titles issued	3,024,000	6,380,033
Area of land protected to maintain biological diversity	9.2%	10.13%

Source: Environment and Natural Resources Joint Sector Review Report 2010/11.

The amount of sector M&E indicators and their cross-cutting nature constitute an unusually high demand for data from a wide range of sources. For some sector performance indicators, there are still gaps in availability of data. The NISR has worked closely with sector stakeholders during the planning phase of the EICV3 to ensure that, where possible, key sector indicators are included in the EICV3 questionnaire. Likewise, the preparation of this report was carried out in close collaboration with sector M&E officers. With their help, a list of indicators was selected that can be provided from NISR sources in order to support the sector in the arrangements for EDPRS2.

This report covers these selected sector performance indicators using mainly EICV3 data, but also further NISR sources. For example, EICV2 data is often used to put indicators into context and to assess trends over time. District estimates from EICV3 are provided in Annex A. In addition, this report refers to other official data sources wherever this is helpful in order to validate and compare the EICV3 estimates with other information, or to discuss issues further where the scope of EICV data ends.

It must be clear, however, that this report cannot cover all of the manifold M&E indicators of the environment and natural resources sector. Given that the EICV is a household-level survey, there are clear limitations in the questions it can answer and the information it can provide. Sometimes,

sector indicators that are not at the household level and therefore not available from EICV can instead be covered by data sources from implementing ministries and agencies. However, in other cases no data currently exist and would require specialised surveys. In a few remaining cases, the sector has expressed interest in household-level information that could be included in future EICV surveys (e.g. rain-water harvesting practices or use of improved cooking stoves) and this will be considered by the NISR in the development of the next EICV. Further data gaps with regard to the sector performance targets are discussed in the relevant chapters.

### 3 Population growth and the environment

Rwanda has a fast-growing population which totalled almost 11 million people in 2011. There is no question that population growth can contribute to environmental degradation, because it puts increased pressure on the assimilative capacity of the environment.<sup>1</sup> These effects can, of course, be mitigated through modern technologies or citizen awareness programmes. However, understanding population growth and surrounding topics are an important starting point when thinking about Rwanda and the state of its environment.

The population of Rwanda is projected to increase to almost 14 million people by 2020 as the medium-level projections in Table 3.1 make clear. However, it is important to note that these projections are based on the last census and revised projections are likely to be developed after the coming census.

*Table 3.1 Population projections*

Year	Medium projection			Low projection			High projection		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
2007	9,556,669	4,597,277	4,959,393	9,556,669	4,597,277	4,959,393	9,556,669	4,597,277	4,959,393
2008	9,831,501	4,736,104	5,095,397	9,822,186	4,731,386	5,090,800	9,834,124	4,737,433	5,096,691
2009	10,117,029	4,880,233	5,236,796	10,088,891	4,866,000	5,222,890	10,124,927	4,884,228	5,240,699
2010	10,412,820	5,029,450	5,383,371	10,355,902	5,000,683	5,355,219	10,428,754	5,037,503	5,391,252
2011	10,718,379	5,183,505	5,534,874	10,622,222	5,134,936	5,487,286	10,745,236	5,197,070	5,548,166
2012	11,033,141	5,342,112	5,691,029	10,886,790	5,268,224	5,618,566	11,073,944	5,362,712	5,711,232
2013	11,355,940	5,504,823	5,851,118	11,148,087	5,399,922	5,748,166	11,414,031	5,534,141	5,879,890
2014	11,686,013	5,671,262	6,014,751	11,404,881	5,529,415	5,875,466	11,764,863	5,711,047	6,053,816
2015	12,022,635	5,841,011	6,181,624	11,655,990	5,656,058	5,999,932	12,125,840	5,893,074	6,232,766
2016	12,365,180	6,013,754	6,351,427	11,912,094	5,785,266	6,126,828	12,496,460	6,079,969	6,416,491
2017	12,713,052	6,189,185	6,523,867	12,172,222	5,916,517	6,255,705	12,876,243	6,271,487	6,604,756
2018	13,084,188	6,376,440	6,707,748	12,436,438	6,049,867	6,386,571	13,265,836	6,467,991	6,797,845
2019	13,459,227	6,565,654	6,893,573	12,703,981	6,184,924	6,519,057	13,664,744	6,669,229	6,995,516
2020	13,838,421	6,756,987	7,081,434	12,974,095	6,321,300	6,652,795	14,072,509	6,874,964	7,197,544
2021	14,221,792	6,950,451	7,271,341	13,245,866	6,458,528	6,787,339	14,488,685	7,084,972	7,403,713
2022	14,591,018	7,136,748	7,454,270	13,518,555	6,596,228	6,922,327	14,912,874	7,299,049	7,613,825

Source: NISR National Population Projection (2007–2022).

In addition to the overall population growth, population density is a crucial indicator in relation to the environment. This is especially true in the case of Rwanda, which is one of the most densely populated countries both in Africa and the world. The growing strain on natural resources, especially land, is illustrated in Table 3.2 below. As the population of Rwanda grows, a projected 525 persons will on average be sharing a square kilometre of the country. The current density levels are already

<sup>1</sup> For an interesting introduction to the scientific debate on the interactions between population growth and environmental degradation, see Cropper/Griffiths (1994), 'The Interaction of Population Growth and Environmental Quality' in *The American Economic Review*, Vol. 84, No. 2, pp. 250–254.



regarded as a major driver of internal migration as well as stress to the physical environment<sup>2</sup> and density is sure to further increase. (A more detailed assessment of the scarcity of lands in Rwanda can be found in Chapter 7.)

**Table 3.2** *Population density*

	<b>Total population (medium projection)</b>	<b>Density (persons per km<sup>2</sup>)</b>
2007	9,556,669	363
2008	9,831,501	373
2009	10,117,029	384
2010	10,412,820	395
2011	10,718,379	407
2012	11,033,141	419
2013	11,355,940	431
2014	11,686,013	444
2015	12,022,635	456
2016	12,365,180	469
2017	12,713,052	483
2018	13,084,188	497
2019	13,459,227	511
2020	13,838,421	525
2021	14,221,792	540
2022	14,591,018	554

Source: Own calculations based on NISR National Population Projection (2007–2022) and Statistical Yearbook 2011.

Population growth and fertility rates are inseparably linked. Table 3.3 shows that the highest fertility rates in 2010 were found in the Western Province as well as the poorer quintiles (5.4 children per woman in quintile 1). Women with no education had the highest fertility rates.

**Table 3.3** *Current fertility rate*

	<b>Total fertility rate</b>
All Rwanda	4.6
Urban	3.4
Rural	4.8
Kigali City	3.5
South	4.6
West	5.0
North	4.1
East	4.9
No education	5.4
Primary	4.8
Secondary and higher	3.0
Q1	5.4
Q2	5.2
Q3	4.5
Q4	4.4
Q5	3.4

Source: Rwandan Demographic and Health Survey (RDHS) 2010. Note: Total fertility rates are for the period 1–36 months prior to interview. The RDHS employs women’s birth histories to calculate fertility rates.

Despite differences in fertility across regions and income groups, it is important to note that fertility has declined strongly in Rwanda in recent years. As shown in Table 3.4, fertility during the period 2000–2008 remained relatively stable but it has declined considerably since, in 2010 reaching 4.6 children per woman. The RDHS also shows that fertility rates are declining for all women, irrespective of location or income; however, the decline is strongest in the Northern Province and wealthier households.

**Table 3.4 Trends in fertility**

Age group	1992 RDHS	2000 RDHS	2005 RDHS	2007–08 RDHS	2010 RDHS
15–19	60	52	42	40	41
20–24	227	240	235	211	195
25–29	294	272	305	272	248
30–34	270	257	273	246	217
35–39	214	190	211	209	164
40–44	135	123	117	105	98
45–49	46	33	32	20	21
Total	6.2	5.8	6.1	5.5	4.6

Source: RDHS 2010. Note: Note: Age-specific fertility rates are per 1,000 women. The RDHS employs women’s birth histories to calculate fertility rates.

As mentioned earlier, population growth can contribute to environmental degradation. However, these effects can be mitigated through modern technologies or awareness programmes. It is very difficult to measure the population’s level of awareness with regard to environmental degradation and protection, given that awareness is not easily quantified. The EICV3 did, however, ask respondents whether they received any information on environmental issues from various sources. 97% of households stated they did, and meetings as well as radio broadcasts were the main means of receiving such information. The lowest rates of exposure in rural areas are found in the Western Province. Households with lower incomes also tend to be less informed about environmental issues compared to richer households.

Unfortunately, the quality of the information received is not measured and the data cannot assess whether or how the environmental information disseminated among Rwandan households helps to mitigate the negative effects of humans on the environment.

**Table 3.5 % of HHs that receive information about environmental issues, and main sources of information**

EICV3	% of HHs receiving any info on environmental issues	Of those receiving information, main source of information						Total no. of HHs receiving information (000s)
		Meetings	School	Radio	Other media	Other	Total	
All Rwanda	96.7	56.9	0.7	40.7	1.3	0.3	100.0	2,179
Kigali City	97.1	32.7	1.9	55.2	9.1	1.1	100.0	217
Southern Province	96.7	56.2	0.6	42.2	0.3	0.6	100.0	531
Western Province	94.0	66.1	1.0	32.4	0.3	0.1	100.0	496
Northern Province	97.6	55.9	0.2	42.7	1.0	0.2	100.0	401
Eastern Province	98.6	59.8	0.5	39.6	0.2	0.0	100.0	534

Urban	96.3	36.5	1.5	54.5	6.7	0.8	100.0	319
Rural	96.8	60.4	0.6	38.4	0.3	0.2	100.0	1,860
Q1	95.0	72.6	0.4	26.6	0.1	0.3	100.0	363
Q2	96.6	64.0	0.7	34.8	0.3	0.2	100.0	401
Q3	97.2	59.1	0.5	39.9	0.3	0.2	100.0	435
Q4	97.0	55.8	0.7	42.9	0.3	0.3	100.0	475
Q5	97.4	39.3	1.2	54.2	4.7	0.6	100.0	506

Source: EICV3.

In the light of this data, it might be helpful to know that radio broadcasts appear to be a cost-effective and inclusive way of disseminating information to the population. As shown in Table 3.6 below, radio ownership is now at 60% of households in Rwanda, and it differs strongly from other ICT devices in that ownership is not limited to the urban rich. 61% of rural households now own a radio, and this is still true for 43% of the poorest households. Making further use of radios to increase the population's awareness of environmental degradation and protection seems advisable. Of course, the information and recommendations made available need to be presented in a format that is digestible and directly applicable by even the uneducated parts of the population.

**Table 3.6** Ownership of ICT devices

EICV3	Mobile phone	Landline phone	Computer	Radio	TV set	Total no. of HHs(000s)
All Rwanda	45.2	0.8	1.7	60.3	6.4	2,253
Kigali City	79.6	2.9	10.5	57.3	35.8	223
Southern Province	35.0	0.3	0.5	60.4	2.1	549
Western Province	40.4	0.7	0.6	51.7	4.1	528
Northern Province	41.9	1.0	1.4	63.8	4.5	411
Eastern Province	48.4	0.4	0.5	66.9	2.3	542
Urban	71.5	2.2	8.5	57.7	29.3	331
Rural	40.6	0.6	0.5	60.7	2.5	1,921
Q1	17.6	0.3	0.0	42.9	0.1	381
Q2	32.2	0.3	0.0	58.1	0.1	415
Q3	40.8	0.4	0.0	63.6	0.6	448
Q4	50.7	0.8	0.0	66.3	1.4	490
Q5	74.4	1.9	7.3	66.0	25.8	519

Source: EICV3.

## 4 Human settlement and waste management

The impact of humans on environmental degradation can be mitigated by modern technologies, but equally so by simple behavioural patterns such as the proper treatment of waste or use of sustainable fuels. This chapter and the following two discuss behavioural patterns observed in Rwanda that relate to settlement and construction, waste management, use of fuels and water access.

Traditionally, rural habitat in Rwanda has been made up of scattered and isolated dwellings. Such settlements make it difficult to develop accessible rural infrastructure and provide basic services for sustainable use of natural resources and treatment of the environment. In addition, recent years have seen the emergence of unplanned residential areas in urban centres, which mostly display a strong lack of infrastructural planning. Furthermore, the aftermath of the genocide required interventions in human settlements including ad hoc construction of camps or temporary housing schemes.

All these factors complicate the development of environmentally sustainable forms of human settlement. One example is the fact that Kigali has no system of sewers or a central treatment facility for sewage.<sup>3</sup> Likewise, rubbish collection services reach less than half of urban households.

However, the data shows a clear trend away from the traditional isolated habitat towards *Imidugudu* or other clustered forms of habitat, which is in line with national policy. Figure 4.1 (and Table 4.1 later) show that the proportion of households living in isolated rural dwellings has decreased strongly between 2005/06 and 2010/11.

Figure 4.1 Change in specific habitat types

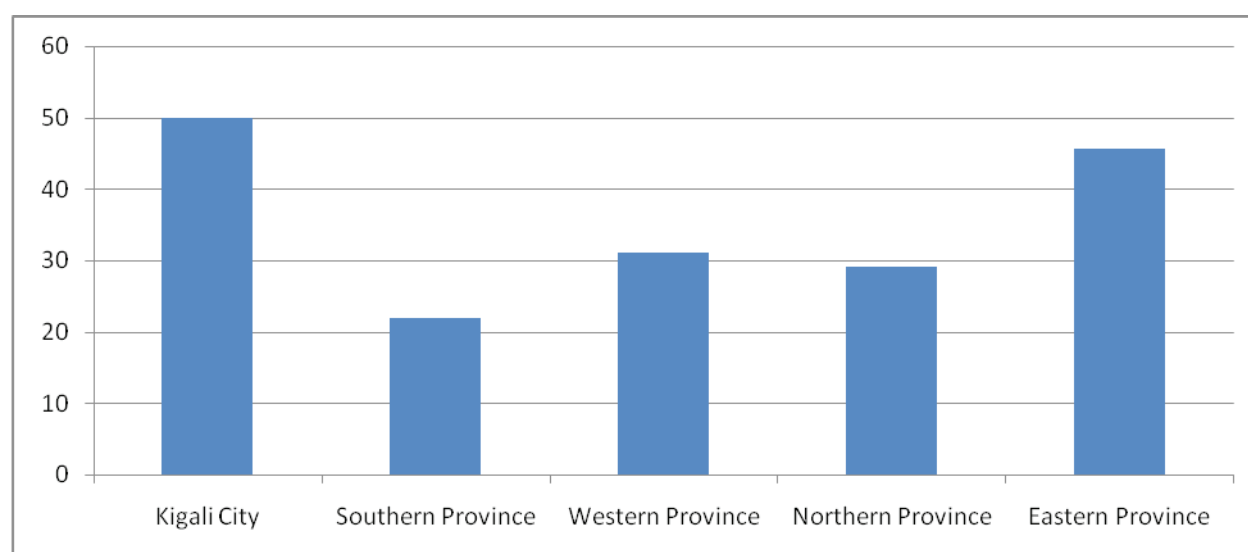


Source: EICV3 and EICV2.

The trend towards modern and clustered settlements, in combination with labour migration and other factors, has led to a very high degree of mobility among the Rwandan population over the last few years. This is illustrated in Figure 4.2, which shows that almost half of Kigali residents have only lived in their current dwelling for less than five years.

<sup>3</sup> Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

Figure 4.2 % of HHs that have lived less than five years in their current dwelling



Source: EICV3.

Despite these pronounced changes in habitat, isolated rural dwellings are still the most common form of housing for the poorest quintile (51%) and especially in the rural Southern Province (57%).

Table 4.1 Types of habitat

EICV3	Type of habitat							Total	Total number of HHs (000s)
	<i>Imidugudu</i>	Unplanned clustered rural housing	Isolated rural housing	Agglomeration	Unplanned urban housing	Modern planned area	Other		
All Rwanda	37.5	11.1	37.2	4.8	8.4	0.6	0.5	100.0	2,253
Kigali City	7.8	2.4	21.9	2.8	62.6	2.4	0.0	100.0	223
Southern Province	18.2	17.1	56.6	5.6	2.0	0.2	0.4	100.0	549
Western Province	25.5	16.9	48.2	6.8	1.9	0.5	0.2	100.0	528
Northern Province	38.4	7.1	44.5	3.7	5.2	1.1	0.1	100.0	411
Eastern Province	80.2	5.8	7.6	3.5	1.3	0.1	1.5	100.0	542
Urban	15.1	6.7	22.4	4.6	48.8	2.4	0.1	100.0	331
Rural	41.3	11.8	39.7	4.8	1.4	0.3	0.6	100.0	1,922
Q1	33	11.8	51.3	3	0.6	0	0.2	100.0	381
Q2	39.2	12.4	42.1	4.3	1.8	0	0.3	100.0	415
Q3	40.1	11.3	40.8	4.5	2.9	0	0.3	100.0	448
Q4	40.9	12.1	36.5	5.4	4.4	0.1	0.6	100.0	490
Q5	33.8	8.3	20.4	6.1	27.9	2.4	1.1	100.0	519

Source: EICV3.

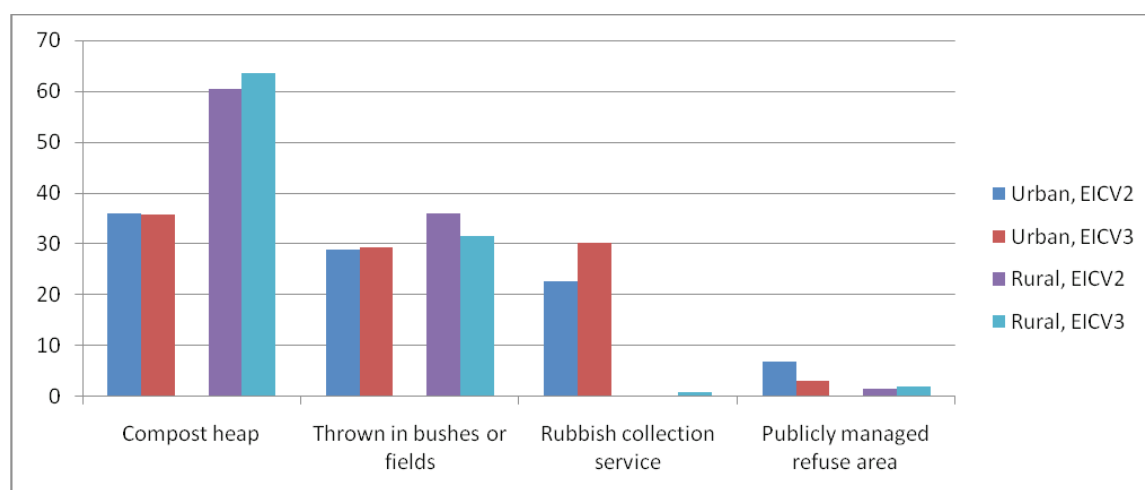
EICV2	Type of habitat						Total	Total number of HHs (000s)
	<i>Imidugudu</i>	Old regrouping (resettlement)	Isolated community	Neighbourhood lot	Unplanned community	Other		
All Rwanda	17.6	6.3	67.1	0.9	6.8	1.3	100.0	1,892
Kigali City	6.6	3.1	36.7	4.9	48.7	0.1	100.0	177
Southern Province	3.9	4.0	89.0	0.6	1.1	1.4	100.0	499
Western Province	5.5	16.2	72.9	0.6	4.2	0.5	100.0	448
Northern Province	13.7	4.6	77.9	0.1	1.8	2.0	100.0	347
Eastern Province	54.8	1.5	38.7	0.6	2.6	1.9	100.0	421
Urban	11.7	6.3	39.4	4.7	33.5	4.4	100.0	311
Rural	18.8	6.4	72.5	0.2	1.5	0.7	100.0	1,581
Q1	13.2	6.7	77.7	0.2	1.1	1.2	100.0	329
Q2	16.1	5.3	75.9	0.0	1.7	1.1	100.0	353
Q3	18.4	6.4	72.4	0.1	1.9	0.9	100.0	368
Q4	19.9	6.3	67.6	0.2	4.4	1.6	100.0	398
Q5	19.5	7.0	47.3	3.5	21.2	1.6	100.0	444

Source: EICV2.

Households that live in modern or planned settlements tend to be provided with better management of waste and sewage. The trends in habitat type are thus accompanied by improvements in waste management, as can be seen in Figure 4.3 and Table 4.2. However, it should be noted that the improvements are not as pronounced as one might expect. In urban areas, provision of refuse collection services has increased from 23 to 30%, and use of compost heaps has increased in rural areas from 60 to 64%. The use of publicly managed refuse areas decreased between EICV2 and EICV3, which can likely be explained by urban households now benefitting from rubbish collection services and therefore no longer using the publicly managed refuse areas as their main mode of rubbish disposal.

These are modest changes and indicate that waste management is still not a priority for many households. As subsequent tables on construction materials will show, Rwandan households have strongly improved their dwellings over the past five years, a development that could be mirrored more closely in waste management behaviour.

Figure 4.3 Changes in use of waste management facilities



Source: EICV3 and EICV2.

**Table 4.2 Waste management facilities**

EICV3	Methods of HHrubbish disposal							Total	Total no. of HHs (000s)
	Compost heap	Thrown in bushes or fields	Dumped in river or lake	Rubbish collection service	Publicly managed refuse area	Burnt	Other		
All Rwanda	59.4	31.1	2.5	5.0	1.9	0.0	0.1	100.0	2,253
Kigali City	20.5	33.4	1.9	42.6	1.6	0.1	0.0	100.0	223
Southern Province	63.3	32.6	1.9	0.2	1.9	0.0	0.0	100.0	549
Western Province	56.8	35.2	3.2	1.7	3.0	0.0	0.2	100.0	528
Northern Province	66.9	28.8	2.8	0.5	1.0	0.0	0.1	100.0	411
Eastern Province	68.3	26.5	2.6	0.9	1.6	0.0	0.1	100.0	542
Urban	35.7	29.2	2.0	30.0	3.0	0.0	0.1	100.0	331
Rural	63.5	31.5	2.6	0.7	1.7	0.0	0.1	100.0	1,922
Q1	56.7	39.6	2.5	0.2	0.8	0.0	0.1	100.0	381
Q2	61.9	34.0	2.4	0.5	1.2	0.0	0.0	100.0	415
Q3	63.9	30.9	3.0	0.7	1.4	0.0	0.1	100.0	448
Q4	64.8	29.4	2.0	1.7	2.0	0.0	0.0	100.0	490
Q5	50.4	24.4	2.7	18.8	3.6	0.0	0.2	100.0	519

Source: EICV3.

EICV2	Methods of HHrubbish disposal							Total	Total no. of HHs (000s)
	Compost heap	Thrown in bushes or fields	Discarded elsewhere	Rubbish collection service	Publicly managed refuse area	Burnt	Other		
All Rwanda	56.4	34.8	1.4	3.9	2.4	0.1	1.1	100.0	1,892
Kigali City	28.6	26.0	3.0	35.7	2.8	0.4	3.6	100.0	177
Southern Province	59.2	35.0	1.6	0.4	3.1	0.1	0.7	100.0	499
Western Province	54.6	40.4	0.5	1.4	1.8	0.1	1.2	100.0	448
Northern Province	62.5	32.5	1.5	0.1	2.9	0.0	0.5	100.0	347
Eastern Province	61.6	34.1	1.2	0.4	1.8	0.1	0.8	100.0	421
Urban	36.0	28.7	3.6	22.6	6.6	0.2	2.3	100.0	311
Rural	60.4	35.9	0.9	0.2	1.6	0.1	0.8	100.0	1,581
Q1	50.7	43.5	2.3	0.1	2.6	0.0	0.9	100.0	329
Q2	57.4	38.2	1.2	0.4	1.6	0.1	1.0	100.0	353
Q3	60.6	36.2	1.0	0.4	1.4	0.0	0.2	100.0	368
Q4	61.2	32.2	1.3	1.6	2.6	0.1	0.9	100.0	398
Q5	52.0	26.6	1.2	14.4	3.6	0.2	2.0	100.0	444

Source: EICV2.



In addition to solid waste management discussed above, the disposal of liquid wastes through improved sanitation facilities is also an important factor in preventing environmental damage. Deep pit latrines can have a hazardous impact on ground water, especially in urban contexts.<sup>4</sup>

Unfortunately, the EICV does not give any information about the construction of the pits used in latrines or on whether these provide sufficient containment of the liquid waste from ground water. We do, however, know that the percentage of households with access to improved sanitation, as defined by the World Health Organisation/UNICEF Joint Monitoring Programme,<sup>5</sup> has increased considerably over the past five years in Rwanda, from 59 to 75%, as shown in Table 4.3

**Table 4.3** % of HHs with access to improved sanitation facilities

EICV3	Total improved sanitation	Improved sanitation				No toilet facilities	Total no. of HHs (000s)
		Flush toilet	Pit latrine with solid slab	Pit latrine without slab	Other		
All Rwanda	74.5	1.7	72.8	19.4	0.0	6.1	2,253
Kigali City	83.3	8.1	75.2	15.2	0.1	1.5	223
Southern Province	66.2	0.6	65.6	27.9	0.0	5.9	549
Western Province	79.2	1.1	78.1	12.5	0.1	8.2	528
Northern Province	74.2	2.0	72.2	18.8	0.0	6.9	411
Eastern Province	74.9	0.6	74.3	19.5	0.0	5.6	542
Urban	82.6	7.5	75.1	14.1	0.0	3.3	331
Rural	73.1	0.7	72.4	20.3	0.0	6.6	1,922
Q1	64.7	0.0	64.7	25.2	0.0	10.1	381
Q2	72.1	0.2	71.9	21.5	0.0	6.3	415
Q3	71.9	0.2	71.7	22.2	0.1	5.9	448
Q4	74.7	0.4	74.3	20.2	0.0	5.1	490
Q5	85.6	6.7	78.9	10.3	0.0	4.1	519

Source: EICV3.

EICV2	Total improved sanitation	Improved sanitation			Other	No toilet facilities	Total no. of HHs (000s)
		Flush toilet	Protected latrines	Unprotected latrines			
All Rwanda	58.5	0.8	57.7	34.8	0.3	6.4	1,892
Kigali City	78.5	4.6	73.9	18.4	0.0	3.0	177
Southern Province	56.2	0.6	55.6	36.1	0.2	7.6	499
Western Province	57.9	0.4	57.5	34.1	0.6	7.5	448
Northern Province	64.6	0.3	64.3	30.2	0.0	5.2	347
Eastern Province	48.5	0.4	48.2	44.7	0.3	6.4	421
Urban	74.9	4.2	70.6	20.2	0.1	4.9	311
Rural	55.3	0.2	55.1	37.7	0.3	6.7	1,581
Q1	42.4	0.2	42.2	45.7	0.1	11.8	329
Q2	51.1	0.0	51.1	40.6	0.5	7.8	353
Q3	55.6	0.0	55.6	39.0	0.3	5.1	368
Q4	60.9	0.2	60.7	33.1	0.3	5.7	398
Q5	76.6	3.1	73.5	20.2	0.1	3.0	444

Source: EICV2

<sup>4</sup> Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

Finally, the following three tables (Table 4.4, Table 4.5 and Table 4.6) give a picture of the construction materials used in houses in Rwanda (roofing, walls and flooring) and how this has changed over time. It is notable that considerable improvements can be observed; for example, the increase in households with cement floors, the growing trend of using bricks for walls rather than tree trunks, or the switching from thatched roofs to metal sheets (as encouraged by the government). All of these major trends are illustrated in Figure 4.4. The observed improvements in housing are a result of both economic development and settlement mobility – it remains to be hoped that these general developments are accompanied by similar improvements in environmental awareness and behaviour.

Figure 4.4 Changes in use of various construction materials for roofing, walls and flooring



Source: EICV3 and EICV2.

Table 4.4 Roofing material of the dwelling

EICV3	Roofing material				Total	Total no. of HHs (000s)
	Thatch or leaves	Metal sheets/corrugated iron	Clay tiles	Other		
All Rwanda	2.2	54.4	42.5	1.0	100.0	2,253
Kigali City	1.7	94.6	3.3	0.4	100.0	223
Southern Province	1.8	14.7	82.7	0.7	100.0	549
Western Province	3.1	43.6	52.3	1.0	100.0	528
Northern Province	2.0	49.0	48.6	0.5	100.0	411
Eastern Province	2.0	92.5	3.8	1.6	100.0	542
Urban	0.7	79.8	19.1	0.4	100.0	331
Rural	2.4	50.0	46.5	1.0	100.0	1,922
Q1	4.8	39.7	53.8	1.7	100.0	381
Q2	2.6	45.3	51.1	1.0	100.0	415
Q3	1.4	49.7	47.8	1.0	100.0	448
Q4	1.7	56.5	41.1	0.7	100.0	490
Q5	1.0	74.4	24.2	0.4	100.0	519

Source: EICV3.

EICV2	Roofing material				Total	Total no. of HHs (000s)
	Thatch or leaves	Metal sheets/corrugated iron	Clay tiles	Other		
All Rwanda	9.8	43.7	43.3	3.2	100.0	1,892
Kigali City	2.3	93.3	3.0	1.4	100.0	177
Southern Province	8.0	14.1	76.3	1.6	100.0	499
Western Province	5.8	36.7	54.2	3.4	100.0	448
Northern Province	9.7	37.3	50.2	2.8	100.0	347
Eastern Province	19.6	70.7	3.9	5.8	100.0	421
Urban	2.8	73.7	18.7	4.8	100.0	311
Rural	11.2	37.8	48.1	2.8	100.0	1,581
Q1	19.8	25.9	49.9	4.4	100.0	329
Q2	11.2	33.0	51.8	3.9	100.0	353
Q3	9.9	39.0	48.1	3.1	100.0	368
Q4	7.2	46.3	43.1	3.4	100.0	398
Q5	3.7	67.1	27.9	1.4	100.0	444

Source: EICV2.

*Table 4.5 Wall material of the dwelling*

EICV3	Wall material						Total	Total no. of HHs (000s)
	Mud bricks	Mud bricks covered with cement	Tree trunks with mud	Tree trunks with mud and cement	Oven fired bricks	Other		
All Rwanda	36.1	18.7	35.2	5.5	2.5	1.9	100.0	2,253
Kigali City	9.7	50.2	17.6	14.5	5.3	2.8	100.0	223
Southern Province	29.6	18.7	43.6	6.1	1.8	0.0	100.0	549
Western Province	56.5	11.4	24.3	1.3	2.3	4.3	100.0	528
Northern Province	42.5	13.1	35.1	3.1	3.5	2.7	100.0	411
Eastern Province	29.0	17.3	44.7	7.2	1.3	0.3	100.0	542
Urban	19.7	43.4	17.1	10.7	6.8	2.2	100.0	331
Rural	39.0	14.5	38.3	4.6	1.7	1.9	100.0	1,922
Q1	45.6	5.1	45.8	1.5	0.2	1.8	100.0	381
Q2	43.7	9.6	42.6	2.6	0.4	1.1	100.0	415
Q3	40.9	12.8	39.3	4.4	0.5	2.1	100.0	448
Q4	35.5	19.0	35.7	6.7	1.2	1.9	100.0	490
Q5	19.7	41.0	17.6	10.7	8.6	2.4	100.0	519

Source: EICV3.

EICV2	Wall material						Total	Total no. of HHs (000s)
	Mud bricks	Mud bricks covered with cement	Tree trunks with mud	Tree trunks with mud and cement	Oven fired bricks	Other		
All Rwanda	33.5	9.2	47.4	5.7	2.2	1.9	100.0	1,892
Kigali City	19.0	31.1	23.0	18.8	6.3	1.8	100.0	177
Southern Province	27.3	11.2	53.4	5.3	2.1	0.6	100.0	499
Western Province	58.4	6.2	29.8	1.2	2.3	2.2	100.0	448
Northern Province	38.6	3.9	50.7	3.1	1.0	2.9	100.0	347
Eastern Province	16.2	5.3	66.7	7.5	1.5	2.8	100.0	421
Urban	23.4	26.5	27.7	13.0	6.9	2.5	100.0	311
Rural	35.5	5.8	51.3	4.3	1.3	1.9	100.0	1,581
Q1	30.8	1.9	62.6	1.8	0.2	2.8	100.0	329
Q2	35.5	3.1	56.6	2.7	0.4	1.7	100.0	353
Q3	37.7	5.8	50.0	4.1	1.0	1.5	100.0	368
Q4	35.9	9.0	47.3	5.3	1.0	1.5	100.0	398
Q5	28.2	22.6	26.8	12.6	7.2	2.6	100.0	444

Source: EICV2.

**Table 4.6** Floor material of the dwelling

EICV3	Floor material					Total	Total no. of HHs (000s)
	Beaten earth	Cement	Bricks	Hardened dung	Other		
All Rwanda	78.4	17.1	1.5	2.2	0.8	100.0	2,253
Kigali City	34.7	60.0	0.7	0.4	4.2	100.0	223
Southern Province	82.0	13.6	3.1	1.1	0.2	100.0	549
Western Province	86.5	10.3	2.3	0.1	0.8	100.0	528
Northern Province	87.4	11.2	0.6	0.1	0.6	100.0	411
Eastern Province	77.9	14.1	0.3	7.5	0.2	100.0	542
Urban	43.3	50.4	2.3	1.1	3.1	100.0	331
Rural	84.4	11.4	1.4	2.3	0.5	100.0	1,922
Q1	96.0	2.3	0.7	0.9	0.2	100.0	381
Q2	91.6	3.8	1.4	2.5	0.6	100.0	415
Q3	87.5	7.3	1.9	2.9	0.4	100.0	448
Q4	81.9	13.4	1.7	2.8	0.2	100.0	490
Q5	43.7	50.5	1.8	1.5	2.4	100.0	519

Source: EICV3.

EICV2	Floor material				Total	Total no. of HHs (000s)
	Earth	Cement	Bricks	Other		
All Rwanda	84.5	13.3	1.6	0.7	100.0	1,892
Kigali City	43.1	54.7	0.7	1.5	100.0	177
Southern Province	85.5	11.0	3.2	0.2	100.0	499
Western Province	87.9	9.2	2.3	0.6	100.0	448
Northern Province	93.1	6.5	0.2	0.1	100.0	347
Eastern Province	90.0	8.7	0.5	0.9	100.0	421
Urban	51.3	45.4	2.0	1.3	100.0	311
Rural	91.0	7.1	1.5	0.5	100.0	1,581
Q1	98.2	0.9	0.8	0.1	100.0	329
Q2	95.7	3.1	0.9	0.4	100.0	353
Q3	92.4	5.0	1.9	0.7	100.0	368
Q4	88.9	8.9	1.7	0.6	100.0	398
Q5	55.0	41.6	2.4	1.0	100.0	444

Source: EICV2.

## 5 Energy resources

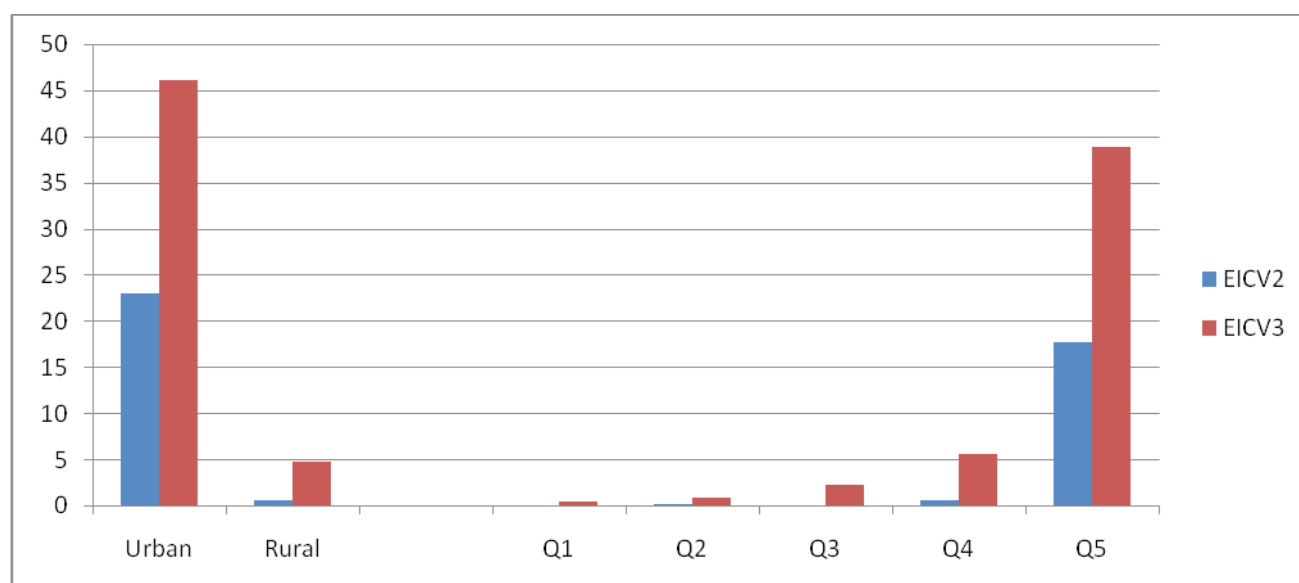
One major strain on the environment is the human use of fuels. For example, large-scale use of firewood can contribute to air pollution,<sup>6</sup> especially through particulates, and this can in turn contribute to human health problems (especially when burning indoors). The excessive use of wood for fuel can also result in deforestation.<sup>7</sup> A 2007 national forest inventory identified illegal logging and charcoal production as the main threats to the national forests of Rwanda.<sup>8</sup>

On the other hand, firewood is an essential day-to-day environmental resource that allows Rwandan households to maintain their standard of living. In addition, energy-related sectors such as charcoal production or the exploitation of methane gas from the bottom of Lake Kivu are bound to become increasingly important sources of employment and national income. The Vision 2020 and subsequent policy documents identify a reliable supply of energy as one of the key factors in ensuring continued economic growth.

Hence, a balance must be found between an energy supply that ensures economic development but makes sustainable use of natural resources in the long run. The Vision 2020 energy target is to connect substantial parts of the population to the electricity grid and to drastically reduce the use of wood in national energy consumption.

Table 5.1 and Table 5.2 below show the use of fuels for cooking and lighting in Rwandan households between 2005/06 and 2010/11. It is clear that firewood is still the fuel used for cooking by the vast majority of the rural population (93%). In the cities, charcoal is used by 51% of households, followed by firewood (45%). While rural households have not changed the fuels they use for cooking in the last five years, a slow trend can be observed in the cities away from firewood and toward charcoal.

Figure 5.1 Changes in HH access to electricity (%)



Source: EICV3 and EICV2.

6 In 2005, Rwanda still had one of the lowest emissions of CO<sub>2</sub> per capita in the world (see National Strategy for Climate Change and Low Carbon Development, Government of Rwanda, October 2011).

7 The environment sector EDPRS Joint Sector Review report 2010/11 estimates national forest cover to be at 22.1% in 2010/11. However, the same report warns that forestry statistics might be unreliable.

8 Cited in Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

The percentage of households connected to electricity has increased substantially over the last five years, especially in the cities. As illustrated in Figure 5.1, the percentage of households with electricity there has doubled from 23 to 46%. Overall, 11% of households in Rwanda now use electricity as their main source of lighting, which is equivalent to approximately 243,000 households. Electricity access is particularly high in Kigali (56% of households). In the provinces outside Kigali, it is highest in the Western Province (8%) and lowest in the Southern Province (3%). Electricity use is heavily skewed towards the richest quintile (39% as compared to 6% in the fourth and 2% in the third quintile). However, even in rural areas the relative change between surveys is considerable. The figure also shows that the change over time has lifted the richest quintile to almost 40% in terms of electricity access. However, the third and fourth quintiles also saw relative increases in access.

The tables below also show that ‘green’ energy sources such as solar power or biogas play a negligible role in household energy use in Rwanda.

**Table 5.1** *Primary fuel used for cooking*

EICV3	Primary source of cooking fuel									Total	Total no. of HHs (000s)
	Firewood	Charcoal	Crop waste	Gas	Biogas	Electricity	Oil or kerosene	Solar panel	Other		
All Rwanda	86.3	10.6	2.3	0.1	0.0	0.0	0.1	0.0	0.5	100.0	2,253
Kigali City	31.5	65.0	0.1	0.6	0.2	0.1	0.2	0.0	2.3	100.0	223
Southern Province	94.1	2.4	3.1	0.0	0.1	0.0	0.0	0.0	0.2	100.0	549
Western Province	92.2	7.6	0.0	0.0	0.0	0.1	0.0	0.0	0.2	100.0	528
Northern Province	90.9	4.5	3.9	0.0	0.0	0.1	0.0	0.0	0.6	100.0	411
Eastern Province	91.7	4.2	3.4	0.1	0.0	0.0	0.1	0.0	0.4	100.0	542
Urban	45.3	50.9	1.0	0.4	0.2	0.2	0.2	0.0	1.8	100.0	331
Rural	93.4	3.7	2.5	0.0	0.0	0.0	0.0	0.0	0.3	100.0	1,922
Q1	95.4	0.5	3.8	0.0	0.0	0.0	0.0	0.0	0.3	100.0	381
Q2	95.4	1.6	2.9	0.0	0.0	0.0	0.0	0.0	0.1	100.0	415
Q3	94.2	3.0	2.7	0.0	0.0	0.0	0.0	0.0	0.1	100.0	448
Q4	91.0	6.6	2.0	0.0	0.0	0.0	0.0	0.0	0.4	100.0	490
Q5	61.0	35.7	0.7	0.3	0.1	0.2	0.3	0.0	1.6	100.0	519

Source: EICV3.

EICV2	Primary source of cooking fuel								Total	Total no. of HHs (000s)
	Firewood	Charcoal	Miscellaneous burning	Gas	Electricity	Kerosene	Other			
All Rwanda	88.2	7.9	2.7	0.0	0.1	0.1	0.9	100.0	1,892	
Kigali City	38.9	57.1	0.2	0.1	0.1	0.6	2.9	100.0	177	
Southern Province	96.5	2.4	0.4	0.0	0.0	0.0	0.6	100.0	499	
Western Province	94.6	3.7	1.2	0.0	0.1	0.1	0.3	100.0	448	
Northern Province	86.1	2.6	10.2	0.0	0.0	0.1	1.0	100.0	347	



Eastern Province	94.0	2.7	2.1	0.0	0.0	0.0	1.2	100.0	421
Urban	51.4	42.7	1.5	0.1	0.3	0.5	3.6	100.0	311
Rural	95.4	1.1	3.0	0.0	0.0	0.0	0.4	100.0	1,581
Q1	93.6	0.3	5.5	0.0	0.0	0.0	0.6	100.0	329
Q2	94.1	0.9	4.0	0.0	0.0	0.0	0.9	100.0	353
Q3	96.1	0.9	2.4	0.0	0.0	0.0	0.5	100.0	368
Q4	92.7	4.9	1.8	0.1	0.0	0.1	0.5	100.0	398
Q5	68.9	27.6	0.8	0.1	0.3	0.4	1.9	100.0	444

Source: EICV2

**Table 5.2** Primary fuel used for lighting

EICV3	Primary source of lighting										Total	Total no. of HHs (000s)
	Electricity distributors	Oil lamp	Fire wood	Candle	Lantern	Battery	Solar panel	Bio gas	Generator	Other		
All Rwanda	10.8	9.7	8.8	5.9	34.7	28.6	0.3	0.0	0.1	1.1	100.0	2,253
Kigali City	55.6	9.6	0.8	12.6	13.8	6.4	0.2	0.0	0.0	0.9	100.0	223
Southern Province	3.3	7.2	13.5	4.0	42.7	27.9	0.3	0.1	0.1	1.0	100.0	549
Western Province	8.2	14.8	14.1	6.1	23.7	31.5	0.3	0.0	0.0	1.4	100.0	528
Northern Province	6.7	4.9	8.8	7.0	30.7	40.5	0.3	0.0	0.0	0.9	100.0	411
Eastern Province	5.6	11.0	2.0	4.0	49.0	26.9	0.3	0.0	0.1	1.1	100.0	542
Urban	46.1	11.2	1.5	9.0	23.6	7.9	0.2	0.1	0.0	0.4	100.0	331
Rural	4.8	9.4	10.0	5.3	36.6	32.2	0.3	0.0	0.1	1.2	100.0	1,922
Q1	0.4	5.2	21.2	4.8	30.8	36.2	0.0	0.0	0.0	1.4	100.0	381
Q2	0.8	6.5	9.6	4.2	41.5	35.9	0.2	0.0	0.0	1.5	100.0	415
Q3	2.2	8.8	7.9	4.5	43.6	31.7	0.2	0.0	0.0	1.1	100.0	448
Q4	5.6	12.2	5.6	7.6	39.0	28.5	0.3	0.0	0.0	1.1	100.0	490
Q5	38.9	14.0	2.8	7.6	20.4	14.8	0.7	0.1	0.2	0.7	100.0	519

Source: EICV3.

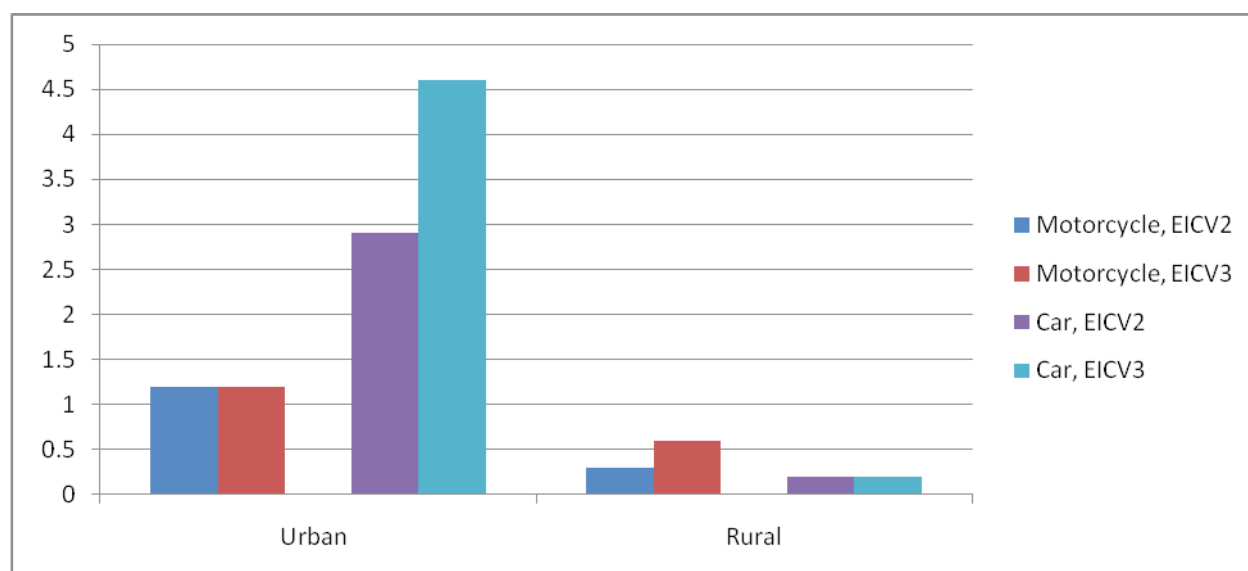
EICV2	Primary source of lighting							Total	Total no. of HHs (000s)
	Electricity distributors	Kerosene lantern	Firewood	Candle	Traditional lamp (Agatadowa)	Generator	Other		
All Rwanda	4.3	12.7	15.2	1.6	64.4	0.0	1.7	100.0	1,892
Kigali City	29.7	29.0	0.7	6.6	33.6	0.0	0.4	100.0	177
Southern Province	2.1	8.2	22.0	1.0	65.1	0.0	1.7	100.0	499
Western Province	2.0	16.7	21.5	0.9	56.2	0.0	2.7	100.0	448
Northern Province	1.0	8.6	15.8	2.3	70.6	0.0	1.6	100.0	347
Eastern Province	1.7	10.1	6.2	0.4	80.3	0.1	1.2	100.0	421

Urban	23.1	28.7	3.2	4.8	38.7	0.0	1.5	100.0	311
Rural	0.7	9.5	17.6	1.0	69.5	0.0	1.7	100.0	1,581
Q1	0.0	3.0	38.0	0.8	54.8	0.0	3.4	100.0	329
Q2	0.2	3.9	19.5	0.3	74.1	0.0	2.1	100.0	353
Q3	0.1	7.4	14.1	1.2	75.5		1.7	100.0	368
Q4	0.6	14.9	7.2	1.3	75.1		0.9	100.0	398
Q5	17.8	29.3	3.1	3.8	45.2		0.8	100.0	444

Source: EICV2.

In addition to fuel used in household cooking and lighting, private ownership of motorised vehicles is another source of demand for fuels. However, as illustrated in Figure 5.2 below, ownership of motorised vehicles in Rwanda is still very low. Despite some relative increases in car ownership in urban areas, it is still less than 5% of urban households that own a car and less than 2% that own a motorcycle.

Figure 5.2 Changes in private ownership of motorised vehicles (% of HHs)



Source: EICV3 and EICV2.

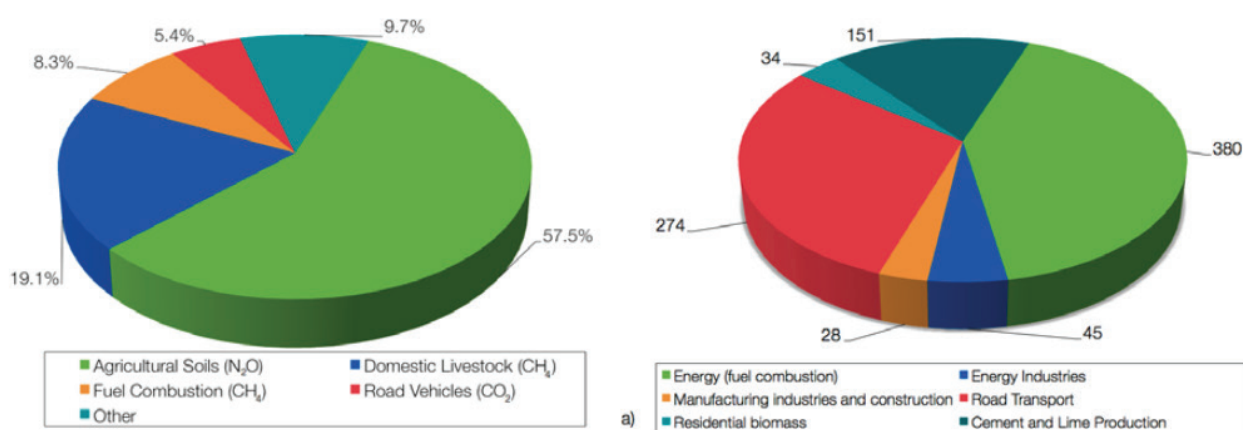
It is important to note that the ownership rates presented are for privately used vehicles only, i.e. they exclude vehicles for commercial use, including motos etc. A study commissioned by REMA in 2011 shows the number of vehicles registered in Kigali in 2009 and this shows that almost 35,000 motorcycles were registered in Kigali in 2009. Thus, commercially used vehicles should be considered an additional source of fuel demand as well as emissions.

In addition to household combustion of fuels and vehicle use discussed above, commercial/industrial use of fuels can also constitute a major source of energy demand. Given that the EICV survey is a household survey it cannot provide any information on such energy use. However, the 2011 National Strategy for Climate Change and Low Carbon Development provides an indicative overview of Rwanda's emissions into the atmosphere in 2005, represented in Figure 5.3.<sup>9</sup> Manufacturing

<sup>9</sup> The National Strategy document warns that 'there are uncertainties in the GHG inventory due to inadequate representation, lack of basic data and

industries and cement/lime production constitute one major source of CO<sub>2</sub> in Rwanda. However, the document also states that Rwanda has one of the lowest greenhouse gas (GHG) emissions per capita in the world. Nevertheless, emissions have shown an upward trend between 2003 and 2006 and are likely to rise further. Therefore, industrial demand for energy resources should also be considered in the context of environmentally and economically sustainable supply of energy. Cleaner technologies in industries seem like an important way forward, and the REMA M&E report 2012 suggests that industries are beginning to adopt such technologies.

Figure 5.3 Rwanda's key sources of GHG emissions and CO<sub>2</sub> inventory (in Gg) for 2005



Source: National Strategy for Climate Change and Low Carbon.

application of emissions factors for different conditions. Owing to the rapid development in energy and industry in Rwanda, these figures need to be revisited to account for uncertainties in growth projections, energy intensity and the energy supply mix.'

## 6 Water resources

In addition to energy, another essential natural resource for human survival and development is water. Access to safe drinking water has a direct impact on people's quality of life, health, and productivity.<sup>10</sup> The EDPRS policy action for water resources is 'to ensure sustainable and integrated water resources management and development for multipurpose use (energy production, irrigation, navigability, safe drinking water...).' <sup>11</sup>

Rwanda is divided into two major drainage basins: the Nile to the east and the Congo to the west. The country's hydrological network includes numerous lakes and rivers as well as its associated wetlands, which cover more than 10% of the country's surface.<sup>12</sup>

Water as a natural resource is required for domestic use, industrial use and agriculture. A 2005 Ministry of Lands, Environment, Forestry, Water and Natural Resources publication projected that domestic water use in Rwanda will more than double for most households between 2005 and 2020. Industrial and agricultural water use was also projected to increase drastically as the country develops economically.<sup>13</sup> This increasing demand will require careful management of the country's water resources.

The EICV does not collect data on the amount of water used by households. It does, however, allow insights into the types of drinking water sources that households use, and how they acquire their drinking water. Table 6.1 shows that access to improved drinking water sources as defined by the World Health Organisation/UNICEF Joint Monitoring Programme<sup>14</sup> has increased in Rwanda, from 70 to 74%. Kigali City has the largest percentage of households using an improved drinking water source (83%), with 35% of households using a public standpipe and 33% having water piped into their dwelling/yard. The proportion of households using surface water (rivers or lakes) as drinking water has decreased from 18 to 12%.

**Table 6.1** % of HHs with access to improved drinking water

EICV3	Total improved water source	Improved water sources						Total no. of HHs (000s)					
		Protected spring	Public stand pipe	Piped into dwelling/yard	Borehole	Protected well	Rain water	Surface water (river or lake)	Unprotected spring	Unprotected well	Tanker truck	Other	
All Rwanda	74.2	38.1	25.7	5.9	1.8	2.3	0.4	11.6	10.6	2.3	0.0	1.3	2,253
Kigali City	82.7	10.0	35.0	32.6	2.1	3.0	0.1	4.4	3.7	0.9	0.0	8.3	223
Southern Province	74.8	54.6	13.2	2.1	0.1	4.7	0.0	11.1	11.0	3.0	0.0	0.1	549
Western Province	74.2	41.0	25.7	3.6	1.1	1.7	1.1	5.8	18.2	1.4	0.0	0.5	528
Northern Province	78.9	46.6	26.6	4.1	0.1	1.0	0.5	9.7	10.2	1.0	0.0	0.2	411
Eastern Province	66.6	23.9	33.9	2.1	5.4	1.2	0.1	22.3	5.8	4.0	0.1	1.3	542

<sup>10</sup> Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

<sup>11</sup> Environment sector EDPRS self-assessment report, December 2011.

<sup>12</sup> Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

<sup>13</sup> Cited in Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

<sup>14</sup> <http://www.wssinfo.org/definitions-methods/watsan-categories/>

Urban	86.4	21.4	33.0	27.8	1.5	2.4	0.2	4.8	2.1	0.9	0.0	5.8	331
Rural	72.1	41.0	24.4	2.1	1.9	2.3	0.4	12.8	12.0	2.5	0.0	0.5	1,922
Q1	68.4	46.5	17.3	0.0	1.6	2.8	0.2	13.3	15.3	2.4	0.0	0.5	381
Q2	71.4	45.4	21.6	0.2	1.6	2.2	0.3	13.3	12.5	2.5	0.0	0.3	415
Q3	71.5	42.4	24.2	0.7	1.8	2.1	0.2	13.8	11.0	2.8	0.0	0.9	448
Q4	73.2	38.0	28.4	1.4	2.1	2.8	0.4	12.8	10.2	2.4	0.0	1.5	490
Q5	84.0	22.7	33.9	23.1	1.8	1.8	0.7	6.1	5.4	1.5	0.1	2.9	519

Source: EICV3.

EICV2	Total improved water source	Improved water sources									Total no. of HHs (000s)
		Public water fountain	Protected spring	Purchased tap water	Drilled well	Public utility (Electrogaz)	Surface water (river or lake)	Unprotected spring	Ordinary well (hand dug)	Other	
Rwanda	70.3	27.7	20.5	13.6	6.1	2.3	17.8	9.3	1.5	1.1	1,892
Kigali City	84.8	7.5	7.9	50.2	5.1	14.0	8.1	5.4	0.4	1.4	177
Southern Province	73.4	29.1	32.8	2.6	7.5	1.3	16.5	8.3	1.5	0.3	499
Western Province	67.8	23.8	22.1	12.8	8.1	0.9	15.2	14.5	1.0	1.6	448
Northern Province	76.7	46.9	14.8	9.5	4.6	1.0	12.8	9.4	0.3	0.7	347
Eastern Province	57.7	22.8	14.1	15.5	4.1	1.2	30.6	6.6	3.4	1.7	421
Urban	83.9	16.7	9.1	38.2	6.7	13.2	9.7	4.6	0.8	1.0	311
Rural	67.6	29.9	22.7	8.8	6.0	0.2	19.4	10.2	1.6	1.1	1,581
Q1	66.6	29.8	22.5	6.7	7.5	0.1	18.5	11.6	2.3	1.1	329
Q2	66.7	29.1	24.6	6.9	6.1	0.0	19.4	11.5	1.6	0.8	353
Q3	67.2	31.9	21.2	8.2	5.9	0.0	19.9	10.2	1.4	1.2	368
Q4	68.9	29.3	20.2	13.6	5.6	0.1	19.9	8.6	1.8	0.7	398
Q5	79.6	20.1	15.3	28.6	5.8	9.7	12.5	5.7	0.5	1.7	444

Source: EICV2.

In addition to information on drinking water sources, we can learn from the EICV survey how far households in Rwanda need to walk in order to get to an improved drinking water source.<sup>15</sup> Table 6.2 shows that rural households can now reach an improved water source more quickly than they could five years ago; 32% of rural households could reach an improved source in 0–14 minutes in EICV2, rising to 41% in EICV3.

<sup>15</sup> The EICV collects data on both geographical distance (in metres) and distance in terms of walking time. It is generally accepted that walking time is a more reliable measure and it appears more informative in the case of Rwanda, where terrain to the source might be steep or inaccessible.

**Table 6.2** Time to improved water source

EICV3	Mean time to improved water source (minutes)	Time to improved water source (minutes)						No improved source	Total	Total no. of HHs (000s)
		Water piped into dwelling/yard	0–4 min	5–14 min	15–29 min	30–59 min	60+ min			
All Rwanda	14.4	5.9	10.2	28.7	16.7	10.3	2.5	25.8	100.0	2,253
Kigali City	9.1	32.6	11.5	20.7	7.9	7.8	2.2	17.3	100.0	223
Southern Province	14.9	2.1	8.5	31.5	19.9	11.0	1.8	25.2	100.0	549
Western Province	13.1	3.6	11.0	33.2	16.7	7.7	1.9	25.9	100.0	528
Northern Province	16.2	4.1	9.4	28.5	20.1	14.4	2.6	21.0	100.0	411
Eastern Province	16.5	2.1	11.1	24.9	14.6	10.2	3.7	33.4	100.0	542
Urban	8.8	27.7	13.7	25.0	10.7	7.9	1.4	13.6	100.0	331
Rural	15.6	2.0	9.5	29.3	17.8	10.7	2.6	27.9	100.0	1,922
Q1	16.7	0.0	7.6	30.0	16.0	12.2	2.5	31.6	100.0	381
Q2	16.1	0.2	8.1	31.1	18.7	10.5	2.8	28.6	100.0	415
Q3	15.9	0.7	9.4	28.9	19.1	11.1	2.3	28.5	100.0	448
Q4	15.2	1.5	11.4	29.9	17.1	10.3	2.9	26.8	100.0	490
Q5	10.3	23.1	13.2	24.4	13.4	8.1	1.8	16.1	100.0	519
Imidugudu	15.9	2.9	10.5	28.4	17.2	11.3	3.2	26.5	100.0	844
Unplanned clustered rural housing	15.8	1.6	10.7	30.2	17.6	12.2	2.6	25.0	100.0	249
Isolated rural housing	15.7	0.4	7.2	31.6	19.3	10.4	2.1	29.0	100.0	838
Agglomeration	14.0	6.5	17.4	25.1	15.2	12.2	2.6	21.0	100.0	107
Unplanned urban housing	4.4	43.0	16.7	19.0	5.0	2.7	0.5	13.1	100.0	189
Modern planned area	1.2	82.8	7.5	3.9	0.0	0.0	1.1	4.8	100.0	14
Other	11.0	3.2	17.8	25.9	8.3	8.4	0.0	36.4	100.0	12
No disability	14.2	6.3	10.4	28.7	16.6	10.1	2.4	25.5	100.0	1,839
With disability	15.4	3.7	9.0	28.8	17.3	11.3	2.6	27.3	100.0	414

Source: EICV3.

EICV2	Mean time to improved water source (minutes)	Time to main improved water source (minutes)						No improved source	Total	Total no. of HHs (000s)
		Public utility (Electrogaz)	0–4 min	5–14 min	15–29 min	30–59 min	60+ min			
All Rwanda	17.3	2.3	6.2	28.4	17.3	11.8	4.2	29.7	100.0	1,892
Kigali City	10.9	13.9	12.3	35.7	11.4	8.4	2.9	15.3	100.0	177
Southern Province	18.1	1.3	3.5	29.5	21.5	14.2	3.5	26.6	100.0	499
Western Province	15.8	0.9	7.3	31.0	16.1	9.2	3.2	32.2	100.0	448
Northern Province	19.1	1.0	5.7	27.7	22.0	15.2	5.2	23.3	100.0	347
Eastern Province	20.0	1.2	6.2	21.8	12.2	10.4	6.0	42.3	100.0	421
Urban	11.2	13.2	11.8	35.3	12.7	8.1	2.7	16.1	100.0	311

Rural	18.8	0.2	5.1	27.0	18.2	12.5	4.5	32.4	100.0	1,581
Q1	19.1	0.1	4.2	27.1	17.5	13.4	4.4	33.4	100.0	329
Q2	19.6	0.0	4.6	25.8	19.1	12.2	5.0	33.3	100.0	353
Q3	17.6	0.0	4.8	28.7	18.4	11.5	3.9	32.8	100.0	368
Q4	17.8	0.1	5.8	29.1	17.3	12.3	4.2	31.1	100.0	398
Q5	14.0	9.7	10.6	30.4	14.9	10.2	3.8	20.4	100.0	444
Imidugudu	20.7	0.6	6.4	24.3	13.2	10.5	7.6	37.4	100.0	334
Old regrouping (resettlement)	21.5	2.4	7.3	26.9	18.1	12.8	9.4	23.1	100.0	120
Isolated community	17.7	0.7	4.3	28.4	19.5	13.0	3.3	30.7	100.0	1,269
Neighbourhood lot	4.4	53.9	12.2	20.8	6.4	2.6	0.9	3.2	100.0	17
Unplanned community	7.9	15.8	17.8	38.9	9.8	4.7	0.9	12.0	100.0	128
Other	7.4	0.4	34.7	39.3	4.6	4.8	0.0	16.2	100.0	24
No disability	17.3	2.5	6.3	28.5	17.4	11.8	4.3	29.1	100.0	1,590
With disability	17.5	1.5	5.6	27.6	16.6	11.8	3.8	33.2	100.0	302

Source: EICV2.

An interesting development can be observed when analysing household expenditure on water. In general, expenditure on water constitutes only a negligible proportion of household expenditure (less than 1%). However, there is a clear trend that fewer households receive their water for free when compared to five years earlier. In 2005/06, 81% of households paid nothing for their water whereas this was only true for 69% of households in 2010/11. The increase in households having water piped into their premises (as seen above) explains part of this development, but it might be helpful for the sector to further monitor this indicator in the future. As natural resources become scarce, there is always room for exploiting this scarcity. If water demand in Rwanda indeed grows as projected without an equivalent increase in supply, more households might see themselves facing water charges in the future.

**Table 6.3** % of HH expenditure spent on water

EICV3	Mean HH expenditure on water as % of total expenditure	Mean annual HH expenditure on water	HH expenditure on water (RWF)				Total	Total no. of HHs (000s)
			Pay nothing	1–19,999	20,000–39,999	40,000+		
All Rwanda	0.4	6,870	68.9	21.5	5.7	3.9	100.0	2,253
Kigali City	1.0	27,868	27.7	31.1	21.8	19.4	100.0	223
Southern Province	0.2	2,155	85.2	11.9	1.9	1.0	100.0	549
Western Province	0.3	3,004	79.2	16.9	2.8	1.1	100.0	528
Northern Province	0.3	4,362	76.8	17.6	3.2	2.4	100.0	411
Eastern Province	0.7	8,655	53.5	34.7	7.5	4.3	100.0	542
Urban	0.9	22,952	34.9	31.4	18.4	15.4	100.0	331
Rural	0.4	4,098	74.8	19.8	3.5	2.0	100.0	1,922
Q1	0.2	1,027	86.8	12.4	0.7	0.0	100.0	381
Q2	0.3	1,921	79.8	18.3	1.6	0.3	100.0	415
Q3	0.4	2,984	75.5	21.0	2.7	0.8	100.0	448
Q4	0.5	5,414	68.6	24.2	5.2	2.0	100.0	490
Q5	0.7	19,842	41.6	28.7	15.5	14.2	100.0	519

Source: EICV3. Note: Calculation of average expenditure includes those spending RWF 0. All values presented in prices at the time of the survey (undeinflated).



EICV2	Mean HH expenditure on water as % of total expenditure	Mean annual HH expenditure on water	HH expenditure on water (RWF)				Total	Total no. of HHs (000s)
			Pay nothing	1–19,999	20,000–39,999	40,000+		
All Rwanda	0.3	3,918	81.0	13.7	3.2	2.1	100.0	1,892
Kigali City	1.4	24,987	28.3	37.1	19.2	15.4	100.0	177
Southern Province	0.1	932	94.3	4.4	0.8	0.4	100.0	499
Western Province	0.3	1,567	84.4	13.9	1.3	0.4	100.0	448
Northern Province	0.2	1,105	87.2	11.6	1.1	0.1	100.0	347
Eastern Province	0.4	3,411	78.6	16.6	2.9	1.9	100.0	421
Urban	1.1	17,155	41.7	34.0	14.2	10.1	100.0	311
Rural	0.2	1,313	88.7	9.8	1.0	0.5	100.0	1,581
Q1	0.2	444	92.8	7.1	0.2	0.0	100.0	329
Q2	0.2	648	90.5	9.0	0.4	0.1	100.0	353
Q3	0.2	943	89.9	9.2	0.8	0.2	100.0	368
Q4	0.3	2,153	83.2	14.3	2.0	0.5	100.0	398
Q5	0.7	13,140	55.4	25.7	10.6	8.3	100.0	444

Source: EICV2. Note: Calculation of average expenditure includes those spending RWF 0. All values presented in prices at the time of the survey (undeflated).

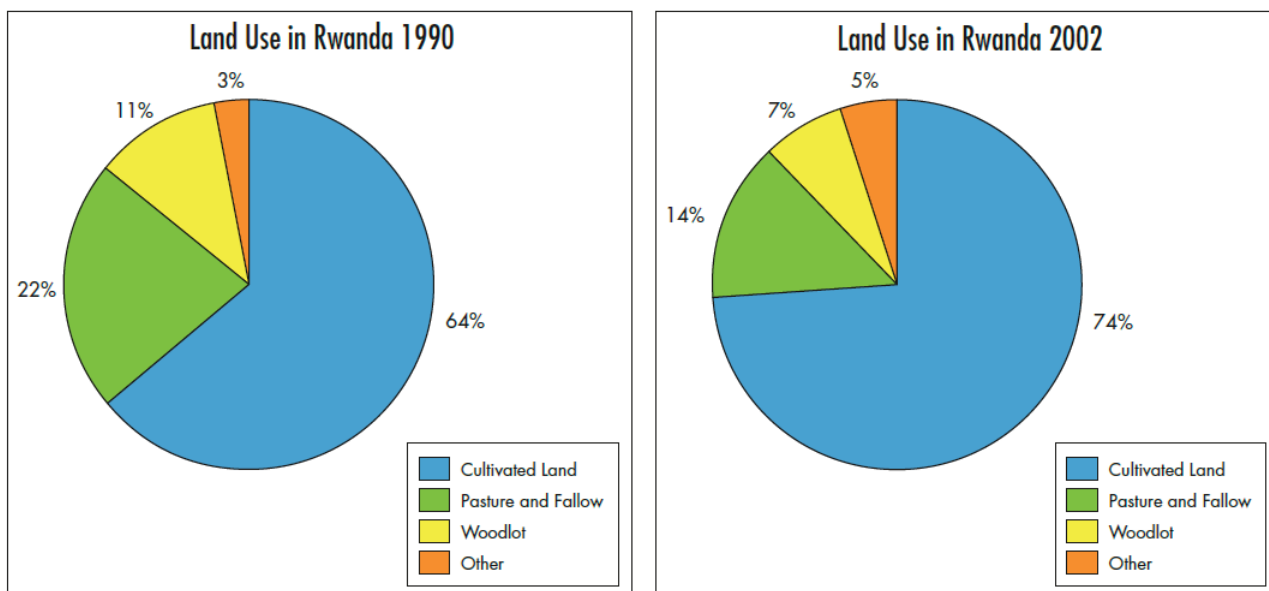
## 7 Land management and agricultural practices

As stated in the sector's EDPRS self-assessment, land is one of the three main factors of production and its finite nature makes it a very valuable natural resource. Use and management need to be carried out in a sustainable and rational manner.

Rwanda is a small country with total arable land of about 1.4 million ha.<sup>16</sup> In addition, lands in Rwanda are used for pasture or exploited as arable marshlands. Figure 7.1 gives an overview of the development of land use between 1990 and 2002. This suggests that land is being farmed intensively and Rwanda cannot afford to let any land lie fallow.

Given a growing population combined with strong reliance on agriculture, it is clear that land is one of the scarcest resources in Rwanda. The EICV collects detailed data on land use and the agricultural activities of Rwandan households. Not being a specialised agricultural survey, it does not, however, provide information on the quality of soils.<sup>17</sup>

Figure 7.1 Changes in land use over time



Source: Mpyisi et al. 2003, cited in REMA/UNEP 2009.

### 7.1 Land distribution

The vast majority of Rwandan households cultivate some amount of land, and most of them are directly reliant on agriculture as their main or only source of income, especially in rural areas. Table 7.1 emphasises this as it shows that 98% of rural households cultivate land.

<sup>16</sup> Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

<sup>17</sup> For further information on agricultural production see EICV3 thematic report on agriculture.

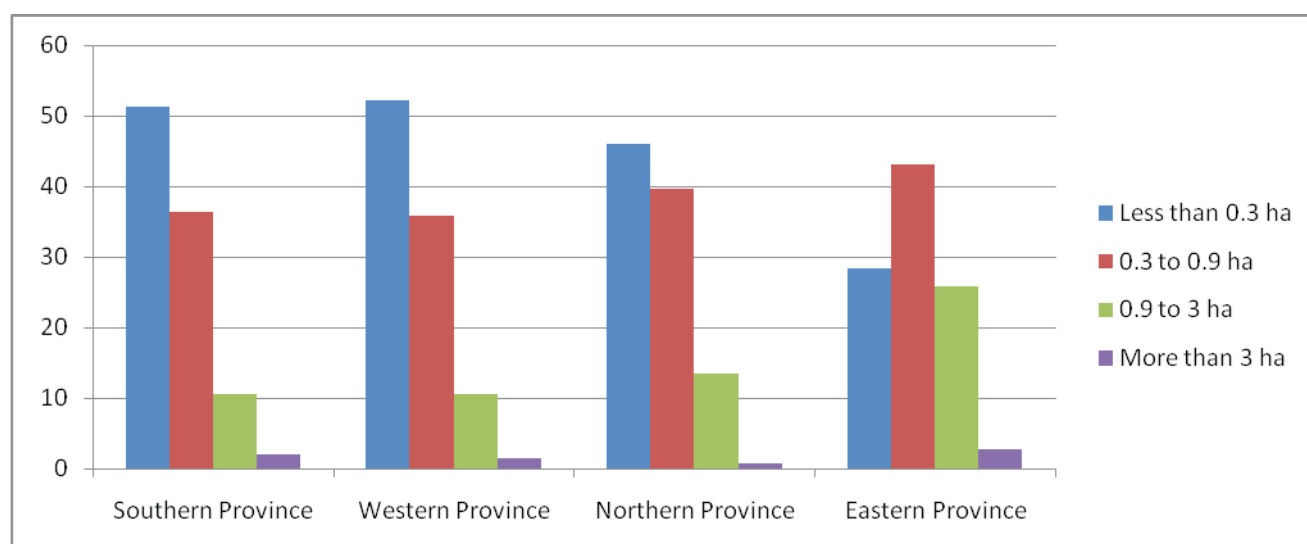
**Table 7.1** % of HHs cultivating any land

	EICV3		EICV2	EICV2	
	% of HHs cultivating at least one parcel	Total no. of HHs(000s)		% of HHs cultivating at least one parcel	Total no. of HHs(000s)
All Rwanda	93.0	2,253		91.5	1,892
Kigali City	55.6	223		42.4	177
Southern Province	97.1	549		96.1	499
Western Province	96.3	528		96.4	448
Northern Province	98.3	411		96.1	347
Eastern Province	96.9	542		97.8	421
Urban	66.2	331		55.6	311
Rural	97.6	1,922		98.6	1,581
Q1	98.7	381		97.2	329
Q2	97.7	415		97.3	353
Q3	97.9	448		97.5	368
Q4	95.2	490		94.5	398
Q5	78.8	519		75.1	444

Source: EICV3 and EICV2.

The average area cultivated per rural household is only 0.6ha. FAO estimates that on average a Rwandan household requires at least 0.9ha to conduct sustainable agriculture.<sup>18</sup> However, only 17% of rural households cultivate 0.9ha or more in Rwanda. This is also shown in Figure 7.2, which illustrates that the majority of households across all provinces cultivate less than 0.9ha, or even less than 0.3ha.

**Figure 7.2** Distribution of total HH land in rural areas, EICV3



With a growing population, land availability is becoming even scarcer over time. As illustrated in Figure 7.3, the average size of land cultivated per rural household has decreased in five years in all provinces except the Southern Province, where it was already lowest out of all provinces five years ago. This finding could have various different explanations but one possibility is that the Southern Province had already reached the point at which no further land sharing between parents and their descendants was possible. The important point to note here is that, in provinces other than the Southern Province, land cultivated per household has reduced between surveys, but it is now on average around 0.5ha across all provinces except Eastern Province – exactly the level at which no further reduction was observed in the Southern Province over the last five years. If the interpretation holds that below this level no further land sharing is possible, Rwanda might see a lot more young individuals without access to land in the Southern, Western and Northern provinces in the coming years. This possibility is further supported by the fact that the proportion of households cultivating less than 0.3ha has not changed much between the surveys, suggesting that there is a minimum amount of land under which no further sharing is possible if households wish to sustain themselves through agriculture.

It is of course clear that all data on land must be interpreted carefully in the light of the various government programmes of land consolidation, rehabilitation and registration that have been implemented over the past years.

Figure 7.3 Changes in average land cultivated in rural areas (ha per HH)

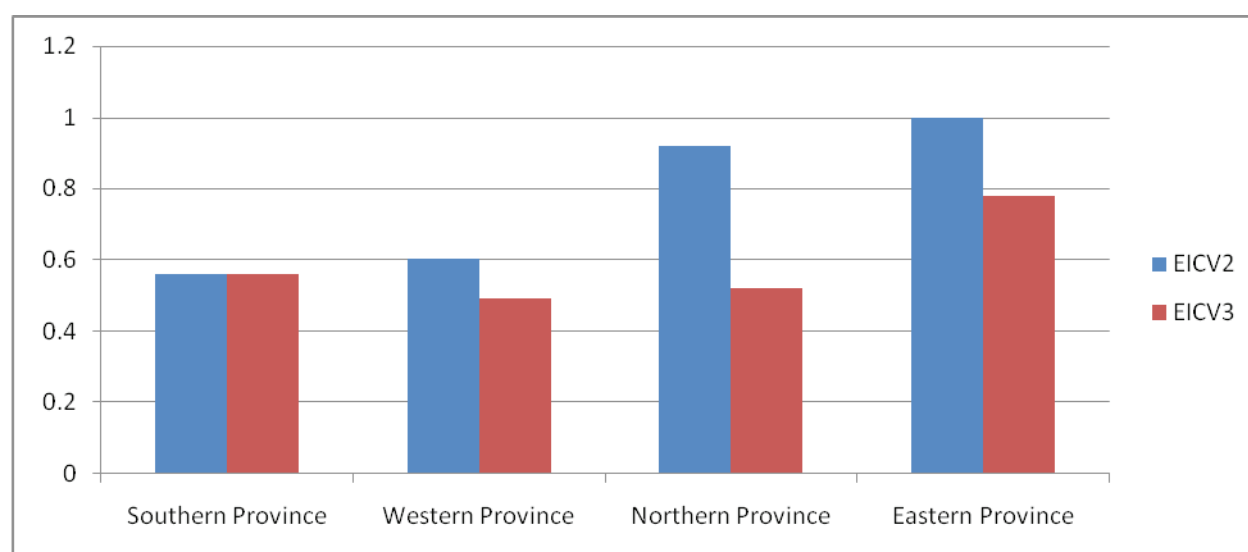


Table 7.2 Size of total land cultivated by HH

EICV3	Average total area cultivated per HH	Less than 0.3 ha	0.3 to 0.9 ha	0.9 to 3 ha	More than 3 ha	Total	Total no. of HHs cultivating land for crop production(000s)
All Rwanda	0.59	45.8	37.6	14.7	1.9	100.0	2,095
Kigali City	0.58	70.3	19.4	7.7	2.6	100.0	124
Southern Province	0.55	51.2	36.4	10.5	2.0	100.0	533
Western Province	0.48	52.1	35.9	10.5	1.5	100.0	508
Northern Province	0.52	46.0	39.7	13.5	0.8	100.0	404
Eastern Province	0.78	28.3	43.1	25.8	2.8	100.0	525

Urban	0.46	67.3	21.1	9.0	2.6	100.0	219
Rural	0.60	43.3	39.5	15.4	1.8	100.0	1,875
Q1	0.37	61.6	31.1	6.6	0.6	100.0	376
Q2	0.49	45.5	41.6	12.4	0.5	100.0	405
Q3	0.54	42.1	41.6	15.2	1.0	100.0	438
Q4	0.67	38.6	40.5	18.3	2.6	100.0	467
Q5	0.83	43.5	32.0	20.0	4.5	100.0	409

Source: EICV3. Note: Calculated on the basis of HHs cultivating land for crop production (i.e. those reporting both cultivating land and producing crops).

EICV2	Average total area cultivated per HH	Less than 0.3 ha	0.3 to 0.9 ha	0.9 to 3 ha	More than 3 ha	Total	Total no. of HHscultivating land for crop production (000s)
All Rwanda	0.75	42.0	32.7	21.7	3.6	100.0	1,732
Kigali City	0.85	47.2	28.6	18.7	5.5	100.0	75
Southern Province	0.58	51.9	31.7	14.2	2.1	100.0	480
Western Province	0.60	52.4	29.1	15.8	2.7	100.0	432
Northern Province	0.90	35.2	36.9	22.5	5.4	100.0	334
Eastern Province	0.97	24.3	35.1	36.2	4.4	100.0	412
Urban	0.63	57.6	24.4	14.6	3.4	100.0	173
Rural	0.77	40.3	33.7	22.4	3.6	100.0	1,559
Q1	0.46	55.1	31.0	12.9	1.0	100.0	320
Q2	0.65	45.2	32.5	19.8	2.4	100.0	343
Q3	0.71	39.7	35.2	22.7	2.4	100.0	358
Q4	0.87	36.9	33.7	24.7	4.6	100.0	376
Q5	1.05	34.5	30.9	27.4	7.3	100.0	333

Source: EICV2. Note: Calculated on the basis of HHs cultivating land for crop production (i.e. those reporting both cultivating land and producing crops).

## 7.2 Land ownership and usability as collateral

One of the strategic objectives of the land sub-sector is to ensure security of land tenure. Section 7.4 below provides detailed information on the LTR process, but before discussing the regularisation process itself it is helpful to understand first the overall dynamics of land ownership in Rwanda. This and the next section therefore present data on ownership and transactions of land in Rwanda.

Table 7.3 presents data on the different types of ownership or use arrangements that households have for their plots. It shows the proportion of households that cultivate land which was inherited, purchased, received as a gift, appropriated, sharecropped or leased. This shows that 70% of households own at least one parcel that was inherited. Furthermore, 45% of cultivating households own a parcel that was purchased (note that percentages for the different acquisition types do not sum up to 100% because households can own more than one plot, with different ways of acquiring them). As expected, quintile patterns differ for land ownership. Richer households are more likely to have purchased land whereas poorer households are more likely to have inherited land.

Comparison with 2005/06 shows a strong increase in the proportion of cultivating households owning a parcel that was purchased, and this is true across all the quintiles. It also shows an increase in households with land use arrangements involving lease or land received as a loan or for free.

**Table 7.3** % of HHs cultivating any parcel that was inherited, purchased, received as gift, received for free use or as loan, appropriated, sharecropped or leased

EICV3	Inherited	Purchased	Received as gift	Received for free use or as loan	Appropriated	Sharecropped	Leased	Total no. of HHs cultivating land for crop production (000s)
All Rwanda	70.1	44.9	17.1	27.0	1.2	18.2	19.5	2,093
Kigali City	41.2	45.2	11.6	32.3	1.6	4.7	10.6	124
Southern Province	79.0	32.9	13.2	35.1	1.9	20.9	22.0	533
Western Province	77.9	46.6	13.0	21.8	0.6	30.8	10.3	508
Northern Province	86.2	50.0	11.7	20.9	0.4	14.5	18.3	404
Eastern Province	48.1	51.7	30.5	27.4	1.6	9.3	28.7	525
Urban	51.3	41.9	12.8	30.5	1.3	9.4	14.1	219
Rural	72.3	45.3	17.6	26.6	1.2	19.2	20.1	1,874
Q1	75.0	33.9	15.2	28.4	1.0	20.6	16.9	376
Q2	75.0	40.8	16.4	30.1	1.0	20.3	20.9	404
Q3	73.3	46.5	17.2	27.6	1.1	19.8	21.5	438
Q4	72.3	48.1	19.1	25.6	1.4	18.3	21.2	466
Q5	55.0	54.0	17.1	23.7	1.3	12.1	16.2	409

Source: EICV3. Notes: Calculated on the basis of HHs cultivating land for crop production. Since households can cultivate more than one parcel, percentages do not total 100.

EICV2	Inherited	Purchased	Received as gift	Received for free use or as loan	Appropriated	Sharecropped	Leased	Total no. of HHs cultivating land for crop production (000s)
All Rwanda	67.1	35.0	19.9	13.4	2.7	19.9	10.1	1,719
Kigali City	58.7	39.4	7.9	23.5	3.9	12.1	12.2	75
Southern Province	80.5	22.9	11.5	16.9	3.8	25.4	10.3	474
Western Province	70.3	37.4	19.0	7.4	2.7	25.1	10.6	429
Northern Province	73.5	44.1	29.1	9.8	1.0	15.1	4.6	332
Eastern Province	44.7	38.4	25.2	16.6	2.6	13.6	13.6	410
Urban	61.1	35.1	12.0	15.2	4.4	16.1	7.9	172
Rural	67.8	35.0	20.7	13.2	2.5	20.4	10.4	1,547
Q1	70.3	24.1	16.8	12.2	3.1	19.2	8.0	317
Q2	68.4	30.9	20.1	13.1	2.9	22.9	8.8	340
Q3	68.8	34.8	22.1	14.3	2.4	20.9	10.8	356
Q4	66.2	39.4	22.2	12.7	2.8	20.7	10.5	374
Q5	62.1	45.0	17.6	14.6	2.5	15.8	12.4	331

Source: EICV2. Notes: Calculated on the basis of HHs cultivating land for crop production. Since households can cultivate more than one parcel, percentages do not total 100.

In addition to providing household income, land can be used as a security in times of hardship – either by selling it or by using it as collateral to request a loan. Table 7.4 shows that 84% of cultivating households have the right to sell their land or use it as a guarantee for a loan. There are no strong differences in patterns across the different rural areas outside Kigali or across the different quintiles.

However, comparison with five years earlier clearly shows that the proportion of households that can sell their land or use it as a guarantee has increased substantially.<sup>19</sup> This is likely to be caused by the LTR process discussed in more detail below in section 7.4.

*Table 7.4 % of HHs that have the right to sell or use any of their parcels as a guarantee for a loan*

<b>EICV3</b>	% of HHs with the right to sell any land or use it as a guarantee	Total no. of HHs cultivating land for crop production (000s)
All Rwanda	84.0	2,093
Kigali City	70.1	124
Southern Province	84.9	533
Western Province	84.2	508
Northern Province	87.6	404
Eastern Province	83.2	525
Urban	73.0	219
Rural	85.2	1,874
Q1	84.0	376
Q2	85.8	404
Q3	84.6	438
Q4	85.4	466
Q5	79.8	409

Source: EICV3. Note: Calculated on the basis of HHs cultivating land for crop production.

<b>EICV2</b>	% of HHs with the right to sell any land or use it as a guarantee	Total no. of HHs cultivating land for crop production (000s)
All Rwanda	70.8	1,719
Kigali City	70.0	75
Southern Province	70.6	474
Western Province	71.5	429
Northern Province	77.0	332
Eastern Province	65.5	410
Urban	59.9	172
Rural	72.0	1,547
Q1	67.5	317
Q2	69.7	340
Q3	73.1	356
Q4	73.3	374
Q5	70.0	331

Source: EICV2. Note: Calculated on the basis of HHs cultivating land for crop production.

19 On gender relations, according to the Environment Joint Sector Review 2010/11, 84% of registered private land has women as owners or co-owners; unfortunately, this number is not comparable with the EICV figures given that the EICV does not record such data on land ownership.



The above table discussed whether households are in theory able to sell their land or use it as a guarantee. Table 7.5 below takes this discussion one step further as it investigates how many households actually used their land as collateral to secure a formal source of credit. It can be assumed that formal credits using land as collateral can only be obtained where secure land tenure exists. The data show that 10% of households in Rwanda were holding a formal source of credit in 2010/11. Out of those, 34% had used land as collateral to obtain the loan.

Unfortunately, direct comparison with five years earlier is not possible because the EICV questionnaire changed in terms of categorising different sources of credit. Only data for EICV3 is therefore presented.

*Table 7.5 % of HHs accessing formal sources of credit using land as collateral*

<b>EICV3</b>	% of HHs with a loan from a formal source	Of those, % of HHs that used land as a collateral to access the loan	Total no. of HHs accessing formal sources of credit (000s)
All Rwanda	9.8	33.8	220
Kigali City	16.2	10.0	36
Southern Province	7.6	41.1	42
Western Province	8.9	35.7	47
Northern Province	8.8	42.5	36
Eastern Province	10.9	36.3	59
Urban	15.6	15.3	52
Rural	8.8	39.5	168
Q1	3.3	47.3	12
Q2	5.7	46.1	24
Q3	7.3	46.1	33
Q4	9.0	45.6	44
Q5	20.7	20.9	107

Source: EICV3. Note: Formal sources of credit are state bank, commercial bank or credit cooperative.

## 7.6 Land transactions during past 12 months

The above data showed that the dynamics of land ownership changed quite considerably over the period 2005/06 to 2010/11. The tables above looked at land ownership types. A different way of looking at it is to analyse land transactions during the past 12 months. If land ownership dynamics have diversified we would also expect to see an increase in land transactions.

As seen in Table 7.6, this is indeed the case. The proportion of households selling and buying land increased, from 11 to 14% and from 6 to 9%, respectively. Likewise, there are more households than before which lent land to others or gave or received land as a gift, inheritance, dowry or otherwise. The average amounts spent and received in land transactions have also increased substantially; however, we cannot know whether this was due to larger plots being sold or the price of land increasing.

**Table 7.6** Land transactions made during the last 12 months

EICV3	In the last 12 months...									Total no. of HHs (000s)
	% of HHs that bought land	For those, average amount spent	% of HHs that sold land	For those, average amount received	% of HHs that rented out land	For those, average amount received	% of HHs that lent land to others	% of HHs that gave land to others as gift, inheritance, dowry, or otherwise	% of HHs that received land from others as gift, inheritance, dowry, or otherwise	
All Rwanda	14.0	162,168	9.0	177,951	11.70	11,568	15.7	5.4	8.3	2,253
Kigali City	6.6	415,733	4.5	643,430	6.50	17,307	26.6	1.4	4.3	223
Southern Province	12.8	99,867	7.4	108,934	13.50	7,775	15.4	5.1	7.7	549
Western Province	16.0	142,223	10.3	136,914	12.70	12,840	12.2	5.7	9.3	528
Northern Province	17.0	168,055	10.6	174,095	12.00	12,674	13.4	7.1	7.8	411
Eastern Province	14.3	187,474	10.2	188,358	10.90	12,594	16.6	5.9	9.9	542
Urban	6.5	333,987	5.5	472,208	8.10	16,030	22.6	2.5	5.4	331
Rural	15.3	149,616	9.7	149,045	12.30	11,070	14.5	6.0	8.8	1,922
Q1	9.0	96,531	8.8	88,036	11.60	7,251	7.7	4.5	7.0	381
Q2	12.7	106,554	9.2	128,018	12.70	9,341	12.5	5.8	7.6	415
Q3	15.1	127,752	9.6	126,505	11.40	10,678	13.9	5.8	9.0	448
Q4	16.8	143,600	9.3	151,487	12.20	13,304	17.4	6.0	10.0	490
Q5	15.3	276,335	8.3	371,013	10.80	16,048	24.0	5.0	7.6	519

Source: EICV3. Note: all average amounts presented are in RWF at prices during the time of the respective survey (undeflated).

EICV2	In the last 12 months...									Total no. of HHs (000s)
	% of HHs that bought land	For those, average amount spent	% of HHs that sold land	For those, average amount received	% of HHs that rented out land	For those, average amount received	% of HHs that lent land to others	% of HHs that gave land to others as gift, inheritance, dowry, or otherwise	% of HHs that received land from others as gift, inheritance, dowry, or otherwise	
All Rwanda	11.2	66,897	5.7	55,473	11.4	5,363	12.1	3.2	5.0	1,892
Kigali City	5.7	97,244	3.7	102,906	6.7	7,958	20.5	1.5	3.3	177
Southern Province	9.4	61,782	3.6	39,253	12.7	3,962	11.7	2.9	5.2	499
Western Province	11.3	58,451	6.7	41,943	12.2	6,918	7.9	4.0	4.9	448
Northern Province	15.4	78,893	7.1	63,782	8.7	5,556	8.6	4.0	5.6	347
Eastern Province	12.1	61,417	6.7	61,694	13.2	4,782	16.4	2.9	4.8	421
Urban	5.2	120,567	2.5	124,159	6.6	8,054	15.7	1.4	3.7	311

Rural	12.4	62,487	6.3	50,052	12.3	5,078	11.4	3.6	5.2	1,581
Q1	5.9	54,295	4.7	35,361	10.4	4,131	5.8	3.0	3.4	329
Q2	8.8	51,752	5.7	44,162	11.0	3,875	9.8	2.8	3.2	353
Q3	12.5	51,835	6.9	50,346	12.8	5,214	10.6	3.4	5.5	368
Q4	13.7	67,902	6.0	55,802	13.1	5,668	13.1	4.4	6.5	398
Q5	13.8	89,085	5.1	85,331	9.7	7,485	18.8	2.5	5.8	444

Source: EICV2. Note: all average amounts presented are in RWF at prices during the time of the respective survey (undeflated).

## 7.7 Land tenure regularisation

The previous two sections shed light on the dynamics of land ownership in Rwanda as well as interactions on the land market. The increases in activity on the land market as well as the diversification of households' land ownership can be assumed to be in large parts due to the LTR process conducted by the government. According to the 2010/11 Joint Sector Review Report, 6,380,033 land titles had been issued by the time of that report. Table 7.7 summarises household exposure to the LTR process, as well as stages of the process. 54% of households had been exposed to the LTR in 2010/11, and most of those were at the stage of either having a claims receipt issued or having their land registered. Only 5% of households exposed to the LTR stated they had their land title issued already, and this was highest in Kigali.

*Table 7.7 % of HHs exposed to LTR, and current stage of the process*

EICV3	% of all HHs exposed to LTR	Of those exposed, current stage of the process									Total no. of HHs exposed (000s)
		Demarcation	Adjudication	Claims receipt issued	Recording objections	Publication of records	Mediation period	Registration	Title issued	Total	
Rwanda	54.1	3.1	11.8	46.3	0.3	0.0	0.6	33.1	4.8	100.0	1,218
Kigali City	57.5	4.5	15.8	39.5	0.2	0.3	0.1	21.5	18.1	100.0	128
Southern Province	55.3	1.6	11.5	59.6	0.1	0.0	0.4	26.6	0.3	100.0	304
Western Province	43.3	5.6	14.6	60.3	1.0	0.1	0.6	15.8	2.2	100.0	228
Northern Province	55.4	5.7	23.2	41.9	0.4	0.0	0.0	25.4	3.2	100.0	228
Eastern Province	61.0	0.5	0.9	30.0	0.1	0.0	1.3	60.8	6.5	100.0	330
Urban	56.5	2.5	14.5	44.7	0.1	0.2	0.7	27.5	9.7	100.0	187
Rural	53.7	3.2	11.4	46.6	0.4	0.0	0.5	34.1	3.9	100.0	1,031
Q1	51.7	4.0	11.6	51.3	0.4	0.0	0.4	29.2	3.2	100.0	197
Q2	54.5	3.9	11.2	48.0	0.4	0.0	0.2	32.7	3.6	100.0	226
Q3	55.6	2.7	11.4	45.3	0.1	0.0	0.1	35.9	4.4	100.0	249
Q4	54.9	3.1	14.2	42.9	0.5	0.0	1.0	33.5	4.8	100.0	269
Q5	53.5	2.3	10.7	45.5	0.2	0.2	1.0	33.2	7.0	100.0	277

Source: EICV3. Note: Stage of process calculated on the basis of those HHs exposed. No comparable data exists for EICV2.

## 7.8 Agricultural practices

One strategic objective of the land sector discussed above is the security of land tenure. Another strategic objective relates to the sustainable and rational use of land in Rwanda. Sustainable use of land is one that allows a family to derive good yields from their agricultural activity but does not degrade soil quality and thereby ensures the usability of lands for many generations to come.

Use of fertilisers is an important issue in this respect, because it allows a more efficient use of the scarce land resources but can also pose a threat of soil degradation if used incorrectly. The Government of Rwanda has decided to subsidise fertiliser use, and this can be seen in the data from the EICV. Table 7.8 shows that the percentage of cultivating households using chemical fertiliser has increased strongly from 11 to 29%. Use of organic fertiliser has also increased slightly, but it should be noted that the EICV collects information on expenditure on fertiliser, not usage. Hence, households that did not pay for their fertiliser (which may often be the case for organic fertiliser) will not appear in this statistic. Likewise, where the Crop Intensification Programme or other government programmes distributed any fertiliser free of charge, this will not count in the data presented below.

*Table 7.8 % of HHs incurring expenditure on fertilisers (inorganic and organic)*

EICV3	Chemical fertiliser	Organic fertiliser	Total no. of HHscultivating land for crop production (000s)
All Rwanda	28.9	9.3	2,093
Kigali City	10.7	5.1	124
Southern Province	26.3	9.7	533
Western Province	37.3	10.4	508
Northern Province	39.0	14.8	404
Eastern Province	20.1	4.7	525
Urban	16.3	7.0	219
Rural	30.4	9.6	1,874
Q1	18.8	5.9	376
Q2	27.7	6.5	404
Q3	31.1	9.4	438
Q4	33.9	11.1	466
Q5	31.6	13.2	409

Source: EICV3. Note: Calculated on the basis of HHs cultivating land for crop production.

EICV2	Chemical fertiliser	Organic fertiliser	Total no. of HHscultivating land for crop production (000s)
All Rwanda	11.0	7.0	1,719
Kigali City	7.6	5.8	75
Southern Province	11.8	8.5	474
Western Province	14.2	7.3	429
Northern Province	12.9	9.2	332
Eastern Province	5.7	3.6	410
Urban	5.1	5.4	172
Rural	11.6	7.2	1,547
Q1	6.1	2.9	317

Q2	7.8	7.1	340
Q3	10.7	6.6	356
Q4	12.6	8.0	374
Q5	17.4	10.4	331

Source: EICV2. Note: Calculated on the basis of HHs cultivating land for crop production.

Irrigation of lands is another important issue for the land sector, given that irrigation schemes allow increased cultivation of otherwise unused or underused lands. In a country where land resources are as scarce as Rwanda, this can help to mitigate the effects of decreasing land availability. The proportion of land irrigated is low, however, at only 3% overall. It is highest in the Eastern Province, at 4.4%.

The hilly geography of Rwanda has led to extensive soil degradation and soil erosion. About 40% of Rwanda's land is classified by the FAO as having a high risk of erosion and about 37% is estimated to require soil retention measures before cultivation. Only 23% of the country's lands is not prone to erosion.<sup>20</sup> Soil erosion control is therefore considered an important factor in ensuring Rwanda's economic development.

Table 7.9 also shows that the push towards erosion control has been successful. According to EICV3 respondents, 78% of land is protected against erosion. The EICV3's estimates (despite the EICV3 not being a specialised agricultural survey) are roughly in line with the estimates produced by the Ministry of Agriculture and Animal Resources. According to the Ministry's Annual Report 2010–2011, 87% of total land is protected from soil erosion.

The same table also shows the land area that was affected by land consolidation, with 12% being affected.

**Table 7.9** % of land irrigated, protected against soil erosion, and affected by land consolidation

EICV3	% of land irrigated	% of land protected against soil erosion	% of land affected by land consolidation	Total cultivated land area (in 000 ha)
All Rwanda	3.0	78.1	11.5	1,228
Kigali City	4.2	74.4	2.0	72
Southern Province	3.1	84.9	6.1	292
Western Province	1.3	80.4	12.0	244
Northern Province	1.9	81.0	20.3	209
Eastern Province	4.3	71.0	12.1	411
Urban	3.3	73.3	8.8	101
Rural	3.0	78.5	11.7	1,128

Source: EICV3. Note: This table is based on all land parcels reported in EICV3. EICV3 is not a specialised agricultural survey and more reliable land area estimates should be obtained from the forthcoming agriculture survey carried out by NISR. However, it is important to note that the total land area estimate obtained from EICV3 (1.23 million ha) is relatively close to the official 2009 REMA estimate of 1.4 million ha of arable land in Rwanda.

20 Rwanda State of Environment and Outlook, REMA/UNEP, 2009.

## 8 Economic dimension of the environment and natural resources sector

The impact of the environmental sector on economic growth is very difficult to assess given that linkages are usually indirect rather than direct. It is safe to say that without the environment and natural resources, no economic development would be possible. The difficulty of measuring the impact of the environmental sector in official statistics is also mentioned with regret in the sector's self-assessment report, which in regard to the forestry sub-sector states that this 'has contributed much to the economic growth through different tree products even though that contribution is not well captured in the official statistics. It provides 90% of energy consumed in the country [and] is contributing to job creation through reforestation, harvesting, processing activities and commercialisation of forest products.' The same can be said of the other sub-sectors such as land or water. In neither of these cases is the link with economic growth directly measurable, despite the obvious fact that the majority of households make a living from their land or could not survive without access to water.

This chapter can therefore only provide some general information on the economic dimensions of the environment and natural resources sector and cannot provide a comprehensive answer to the question how it contributes to economic growth.

Table 8.1 presents data on the percentage of households working in and outside of agriculture. It shows that 72% of working individuals above the age of 16 have their main job in agriculture. This clearly shows that the natural resource of land is an important factor in the country's economy, and this is especially true in rural areas, where agriculture provides main jobs for 78% of the working population.

*Table 8.1 % of population (16+) usually working in agricultural and non-agricultural employment*

EICV3	Usual main job			Total	All 16+ years usually working (000s)
	Agriculture	Non-Agriculture	Other and n.i.		
All Rwanda	71.6	26.6	1.8	100.0	4,960
Kigali City	23.2	72.8	4.0	100.0	487
Southern Province	79.9	18.8	1.3	100.0	1,178
Western Province	71.5	26.5	2.0	100.0	1,164
Northern Province	75.9	23.3	0.8	100.0	955
Eastern Province	80.1	17.9	2.0	100.0	1,175
Urban	33.5	63.0	3.5	100.0	728
Rural	78.2	20.3	1.5	100.0	4,232
Q1	85.2	13.7	1.1	100.0	858
Q2	83.8	15.1	1.1	100.0	928
Q3	79.8	18.8	1.4	100.0	984
Q4	74.2	24.1	1.7	100.0	1,056
Q5	41.9	54.7	3.4	100.0	1,134

Source: EICV3

In addition to agriculture, there are further sectors relating to natural resources which provide jobs for the Rwandan population. Table 8.2 below shows the proportion of working individuals working in the forestry, mining, and recreation and tourism sectors. However, the estimates are very small and show that they currently do not constitute major sectors of job creation in Rwanda. Even so, the total number of jobs in mining has increased by some 60% over a five-year period.

The contribution of the mining sector to national GDP in 2010 was estimated at 1%,<sup>21</sup> but it is one of the key export goods of Rwanda. The sector's 2010/11 Joint Sector Review Report estimates USD 116.8 million of total revenues from mineral exports.

**Table 8.2** % of population (16+) usually working engaged in forestry, mining, and recreation and tourism sectors

EICV3	Usual main job			All 16+ years usually working (000s)
	Forestry	Mining	Recreation and tourism	
All Rwanda	0.3	0.4	0.5	4,960
Kigali City	0.0	0.1	1.8	487
Southern Province	0.2	0.2	0.3	1,178
Western Province	0.7	0.4	0.4	1,164
Northern Province	0.3	1.1	0.4	955
Eastern Province	0.1	0.3	0.2	1,175
Urban	0.1	0.1	1.3	728
Rural	0.3	0.5	0.3	4,232
Q1	0.4	0.5	0.3	858
Q2	0.3	0.4	0.4	928
Q3	0.3	0.4	0.3	984
Q4	0.3	0.5	0.4	1,056
Q5	0.1	0.4	0.9	1,134

Source: EICV3

As already mentioned in the quote above, another source of employment and economic development directly related to natural resources is the tourism sector, especially with regard to natural parks. Rwanda Development Board sources state that tourism revenue is increasing,<sup>22</sup> and this also benefits local communities through revenue-sharing schemes injecting 5% of tourism revenues from park fees into local community projects.

<sup>21</sup> NISR Statistical Yearbook 2011

<sup>22</sup> NISR Statistical Yearbook 2011, but also discussed in Nielsen and Spenceley (2010): The success of tourism in Rwanda, Background paper for the African Success Stories Study, Joint Paper of the World Bank and SNV.



## 9 Human health and the environment

The objective of Vision 2020 is to have a satisfactory state of health for both the urban and rural population, which includes not being exposed to pollution. The EICV and RDHS both provide insights into health dynamics in Rwanda, and the general state of public health in Rwanda is discussed in detail in the latest RDHS report.

As with economic growth, the link between environment and health is difficult to capture through official statistics since the relation is not direct and often not measurable. Table 9.1 attempts a general overview of correlations between environment-related indicators and health complaints. However, it is important to note that this does in no way imply causality. People may be using unimproved drinking water sources and report health complaints, but this does not necessarily mean their water is making them ill – both indicators could simply be strongly correlated with another cause of illnesses such as malnutrition.

The table shows that health problems are higher among people that use non-improved sanitation, and also slightly higher among those using non-improved drinking water sources. Likewise, people lighting their homes with firewood have a higher incidence of health problems compared to others. Among cooking fuels, crop waste displays the highest correlation with health problems, but is similar for the more widely used firewood and charcoal.

*Table 9.1 % of people reporting any illness over past two weeks, by environment-related characteristics*

EICV3	% of individuals reporting any health complaint in the two weeks preceding the survey	Total no. of HHs(000s)
All Rwanda	17.6	10,762
Kigali City	17.3	1,059
Southern Province	20.0	2,527
Western Province	17.3	2,586
Northern Province	14.9	1,981
Eastern Province	17.9	2,609
Urban	17.5	1,595
Rural	17.7	9,167
Q1	17.2	2,123
Q2	17.5	2,122
Q3	18.0	2,124
Q4	18.1	2,133
Q5	17.4	2,260
Non-improved main drinking water source	18.4	2,728
Improved main drinking water source	17.4	8,034
Non-improved sanitation	19.5	2,474
Improved sanitation	17.1	8,288
Main cooking fuel is firewood	17.5	9,338
Main cooking fuel is charcoal	17.7	1,152
Main cooking fuel is crop waste	21.3	225
Main cooking fuel is other	17.9	48
Main lighting fuel is electricity distributor	15.7	1,312
Main lighting fuel is oil lamp	18.2	1,108
Main lighting fuel is firewood	21.8	813



Main lighting fuel is candle	17.6	560
Main lighting fuel is lantern	16.9	3,716
Main lighting fuel is batteries	18.1	3,094
Main lighting fuel is other	17.7	157

Source: EICV3.

The RDHS 2010 report is the main document discussing public health in Rwanda, but the following four tables will give a general overview of four different diseases in Rwanda –diarrhoea, respiratory infections and malaria. All of these can be caused by unfavourable environmental conditions such as unhygienic water, air pollution, or infested swamps. Table 9.2 shows the percentage of children with diarrhoea, which was higher among children that had no access to improved drinking water sources or improved sanitation, and relatively high in the Southern Province. Diarrhoea prevalence is correlated with poverty; 16% of children in the poorest quintile were diagnosed with diarrhoea, as compared to only 11% in the richest.

*Table 9.2 Prevalence of diarrhoea among children*

	% of children with diarrhoea in last two weeks	% of children with diarrhoea with blood in last two weeks
All Rwanda	13.2	2.0
<6	6.6	0.7
6–11	21.8	3.3
12–23	25.0	3.2
24–35	13.3	2.6
36–47	8.7	1.4
48–59	5.6	0.8
Male	14.0	2.2
Female	12.3	1.8
Improved drinking water source	12.7	1.9
Non-improved drinking water source	14.5	2.3
Improved toilet facility (not shared)	11.7	2.0
Non-improved toilet facility	15.1	2.1
Urban	13.6	2.0
Rural	13.1	2.0
Kigali City	11.4	1.5
Southern Province	15.6	2.3
Western Province	13.4	2.6
Northern Province	13.7	1.5
Eastern Province	11.0	1.7
No education	11.2	2.0
Primary	13.9	2.1
Secondary and higher	11.6	1.5
Q1	16.1	2.4
Q2	13.6	2.0
Q3	12.2	2.0
Q4	11.8	1.5
Q5	11.3	2.0

Source: RDHS 2010. Note: Education level refers to mother's education

Table 9.3 presents data on acute respiratory infections (ARI) among children (4%), and this was highest in the Western Province (6%), followed by Kigali. As with diarrhoea, respiratory infections are highest in the poorest quintile (5%).

*Table 9.3 Prevalence of ARI among children*

	% of children with ARI symptoms
All Rwanda	3.7
<6	4.0
6–11	6.3
12–23	5.1
24–35	3.1
36–47	3.4
48–59	2.2
Male	4.1
Female	3.4
Urban	5.2
Rural	3.5
Kigali City	4.6
Southern Province	3.5
Western Province	6.1
Northern Province	2.9
Eastern Province	1.9
No education	4.1
Primary	3.5
Secondary and higher	4.9
Q1	5.1
Q2	3.4
Q3	3.2
Q4	3.1
Q5	3.7

Source: RDHS 2010. Note: Education level refers to mother's education

Finally, Table 9.4 and Table 9.5 show malaria prevalence rates among women and children. Prevalence rates among women are 0.2 in urban and 0.8 in rural areas, and for children this is 0.8 and 1.4, respectively. Eastern Province has the highest incidence of malaria, among both women and children.

**Table 9.4** Prevalence of malaria among women

	% of women with malaria
All Rwanda	0.7
15–19	1.0
20–24	0.8
25–29	0.6
30–34	0.6
35–39	0.9
40–44	0.5
45–49	0.0
Currently pregnant	0.5
Not pregnant/not sure	0.7
Urban	0.2
Rural	0.8
Kigali City	0.1
Southern Province	1.0
Western Province	0.2
Northern Province	0.1
Eastern Province	1.6
No education	1.0
Primary	0.7
Secondary and higher	0.5
Q1	1.4
Q2	0.8
Q3	0.5
Q4	0.7
Q5	0.2

Source: RDHS 2010.

**Table 9.5** Prevalence of malaria among children

	% of children with malaria
All Rwanda	1.4
6–8	0.6
9–11	0.5
12–17	1.0
18–23	1.3
24–35	1.4
36–47	1.8
48–59	1.5
Male	1.5
Female	1.2
Urban	0.8
Rural	1.4
Kigali City	0.2
Southern Province	1.4
Western Province	0.5
Northern Province	0.0
Eastern Province	3.4
No education	1.6
Primary	1.0
Secondary and higher	1.1
Q1	2.1
Q2	1.7
Q3	0.7
Q4	1.2
Q5	1.0

Source: RDHS 2010. Note: Education level refers to mother's education

## 10 Major problems related to the environment

The previous chapters discussed the interactions between humans and the environment, and how the Rwandan population benefits from its natural resources. However, sometimes the environment can also be a major source of destruction, such as through floods or destructive rains.

Table 10.1 shows that 44% of households in Rwanda have experienced some sort of environmental destruction. Most of these relate to reduction in harvests, either directly or through erosion, loss of soil fertility, destructive rains or droughts. As expected, rural households (which rely heavily on natural resources) are more susceptible to environmental destruction than urban households.

*Table 10.1 Problems resulting from environmental destruction*

EICV3	Problems resulting from environmental destruction										Total no. of HHs (000s)
	No major problem	Floods	Erosion	Reduction in agricultural production	Climatic change	Famine/drought	Destructive rains	Loss of soil fertility	Other	Total	
All Rwanda	66.1	0.9	8.2	9.2	5.0	3.4	5.6	1.2	0.3	100.0	2,253
Kigali City	91.5	0.1	3.3	1.4	0.8	0.2	2.4	0.0	0.5	100.0	223
Southern Province	59.4	1.0	8.3	11.9	8.4	4.4	5.7	0.6	0.3	100.0	549
Western Province	64.4	0.8	13.5	8.9	2.3	0.4	6.9	2.4	0.4	100.0	528
Northern Province	72.7	1.3	11.9	4.1	1.5	0.0	6.9	1.1	0.4	100.0	411
Eastern Province	59.2	1.1	2.2	13.6	8.8	9.0	4.6	1.2	0.3	100.0	542
Urban	81.1	0.1	4.6	4.6	2.9	1.0	4.6	0.5	0.6	100.0	331
Rural	63.6	1.1	8.8	10.0	5.4	3.8	5.8	1.3	0.3	100.0	1,922
Q1	63.7	0.6	8.8	9.8	4.6	4.3	6.1	1.8	0.5	100.0	381
Q2	65.2	1.0	8.8	9.0	4.8	4.2	5.3	1.5	0.3	100.0	415
Q3	62.8	0.9	8.5	11.0	5.3	3.8	6.4	1.1	0.2	100.0	448
Q4	64.6	1.3	8.4	9.0	6.1	3.6	5.5	1.3	0.1	100.0	490
Q5	72.9	0.9	6.8	7.3	4.4	1.6	4.9	0.6	0.6	100.0	519

Source: EICV3.

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## Annex A District disaggregation tables for selected indicators from EICV3

### Annex B 1 % of HHs that receive information about environmental issues, and main sources of information

EICV3	% of HHs receiving any info on environmental issues	Of those receiving information, main source of information						Total no. of HHs receiving information (000s)
		Meetings	School	Radio	Other media	Other	Total	
All Rwanda	96.7	56.9	0.7	40.7	1.3	0.3	100.0	2,179
Nyarugenge	95.7	26.5	1.8	54.4	13.3	4.1	100.0	58
Gasabo	97.3	37.1	2.2	57.3	3.4	0.0	100.0	97
Kicukiro	97.9	31.8	1.6	52.5	14.0	0.2	100.0	63
Nyanza	96.6	46.6	1.0	52.2	0.1	0.2	100.0	65
Gisagara	97.9	55.6	0.2	44.2	0.0	0.0	100.0	72
Nyaruguru	98.5	66.5	0.2	33.1	0.2	0.0	100.0	60
Huye	98.2	60.2	0.6	39.2	0.0	0.0	100.0	69
Nyamagabe	91.7	46.9	1.1	50.7	0.2	1.0	100.0	65
Ruhango	95.9	59.5	0.6	39.1	0.8	0.0	100.0	68
Muhanga	96.0	65.7	0.4	33.5	0.2	0.2	100.0	61
Kamonyi	99.0	50.5	0.8	44.6	0.7	3.3	100.0	71
Karongi	92.5	61.3	0.7	37.4	0.4	0.2	100.0	71
Rutsiro	96.2	67.2	0.4	32.0	0.2	0.2	100.0	66
Rubavu	94.5	53.0	1.5	44.1	1.4	0.0	100.0	77
Nyabihu	99.0	80.0	0.1	19.9	0.0	0.0	100.0	68
Ngororero	93.3	59.4	0.4	39.7	0.0	0.5	100.0	69
Rusizi	97.0	68.6	1.0	30.4	0.0	0.0	100.0	75
Nyamasheke	86.7	74.9	2.9	22.1	0.0	0.0	100.0	70
Rulindo	99.0	55.2	0.4	43.9	0.2	0.2	100.0	62
Gakenke	97.0	68.8	0.0	31.2	0.0	0.0	100.0	74
Musanze	99.8	53.4	0.0	44.4	2.2	0.0	100.0	87
Burera	95.0	40.8	0.7	56.8	1.7	0.0	100.0	68
Gicumbi	97.1	58.7	0.2	39.8	0.8	0.5	100.0	110
Rwamagana	95.8	48.2	1.2	49.9	0.5	0.2	100.0	65
Nyagatare	100.0	63.3	0.0	36.7	0.0	0.0	100.0	84
Gatsibo	99.1	63.4	0.2	36.4	0.0	0.0	100.0	99
Kayonza	98.6	60.6	0.2	39.0	0.2	0.0	100.0	69
Kirehe	99.1	61.0	0.2	38.8	0.0	0.0	100.0	71
Ngoma	99.8	53.1	0.6	46.3	0.0	0.0	100.0	68
Bugesera	97.2	64.9	1.2	33.5	0.5	0.0	100.0	78

Source: EICV3.

## Annex B 2 Types of habitat

EICV3	Type of habitat							Total	Total no. of HHs (000s)
	<i>Imidugudu</i>	Unplanned clustered rural housing	Isolated rural housing	Agglomeration	Unplanned urban housing	Modern planned area	Other		
All Rwanda	37.5	11.1	37.2	4.8	8.4	0.6	0.5	100.0	2,253
Nyarugenge	6.5	0.3	18	0.5	73.9	0.8	0	100.0	60
Gasabo	11.2	2.5	36	1.9	46.9	1.5	0	100.0	99
Kicukiro	3.6	4.4	3.8	6.3	76.6	5.4	0	100.0	64
Nyanza	4.1	1.2	78.2	12.8	3.7	0	0	100.0	67
Gisagara	29.6	54.8	13.6	2	0	0	0	100.0	74
Nyaruguru	52.9	5.9	40.1	1.1	0	0	0	100.0	61
Huye	14.2	23.5	52.8	3.2	5.6	0.7	0	100.0	70
Nyamagabe	4.6	4.2	80.2	9.7	1.4	0	0	100.0	71
Ruhango	6.3	4.6	79.7	9	0.4	0	0	100.0	71
Muhanga	5.6	11.2	76.7	2	4.5	0	0	100.0	63
Kamonyi	30.6	27.1	34.2	4.5	0.5	0.6	2.7	100.0	72
Karongi	5.8	3.8	88.9	0	1.5	0	0	100.0	77
Rutsiro	53.5	13.8	29.9	2.5	0.2	0.2	0	100.0	69
Rubavu	40	19.9	9.5	22.1	5.9	2.6	0	100.0	82
Nyabihu	20.7	24.1	37.6	15.8	0	0	1.8	100.0	68
Ngororero	8.5	1.3	87.6	2.5	0	0	0	100.0	74
Rusizi	28.7	52.1	9.7	4.5	4.9	0.2	0	100.0	78
Nyamasheke	21.9	3.5	74.3	0.2	0	0	0	100.0	80
Rulindo	23.6	3.5	71	1.8	0	0	0	100.0	63
Gakenke	71	1.6	27.4	0	0	0	0	100.0	76
Musanze	25.8	1.8	48.4	7	14.1	2.9	0	100.0	87
Burera	43.2	25.6	21.2	10	0	0	0	100.0	71
Gicumbi	31.1	5.4	52.9	0.6	8.1	1.6	0.3	100.0	113
Rwamagana	71.2	4.3	20.1	3.2	1.2	0	0	100.0	68
Nyagatare	64.3	11.6	2.6	8.6	2.8	0.5	9.7	100.0	84
Gatsibo	81.5	0.4	18.1	0	0	0	0	100.0	100
Kayonza	88.7	1.2	2.1	5	3	0	0	100.0	70
Kirehe	94.5	2.3	0.1	3	0	0	0	100.0	72
Ngoma	97.9	0.4	1.1	0	0.6	0	0	100.0	68
Bugesera	67.4	19.1	6.4	5.2	1.7	0.3	0	100.0	80

Source: EICV3.

## Annex B 3 Roofing material of the dwelling

EICV3	Roofing material				Total	Total no. of HHs (000s)
	Thatch or leaves	Metal sheets/corrugated iron	Clay tiles	Other		
All Rwanda	2.2	54.4	42.5	1.0	100.0	2,253
Nyarugenge	0.0	99.0	0.8	0.2	100.0	60
Gasabo	3.5	89.8	6.1	0.6	100.0	99
Kicukiro	0.5	97.9	1.5	0.2	100.0	64
Nyanza	1.4	24.8	72.6	1.2	100.0	67
Gisagara	4.4	10.1	84.8	0.7	100.0	74
Nyaruguru	5.4	7.8	85.3	1.6	100.0	61
Huye	1.7	21.1	76.4	0.7	100.0	70
Nyamagabe	0.8	13.6	84.7	1.0	100.0	71
Ruhango	0.7	2.5	96.0	0.8	100.0	71
Muhanga	0.0	4.5	95.4	0.2	100.0	63
Kamonyi	0.4	31.9	67.5	0.2	100.0	72
Karongi	3.0	17.2	79.8	0.0	100.0	77
Rutsiro	1.9	9.3	88.5	0.2	100.0	69
Rubavu	0.9	69.4	26.7	3.1	100.0	82
Nyabihu	0.6	36.6	61.9	0.8	100.0	68
Ngororero	0.6	6.2	92.8	0.4	100.0	74
Rusizi	7.1	90.1	0.4	2.3	100.0	78
Nyamasheke	6.6	67.5	25.9	0.0	100.0	80
Rulindo	1.4	35.1	62.9	0.6	100.0	63
Gakenke	0.2	19.4	80.1	0.2	100.0	76
Musanze	2.0	64.2	33.1	0.7	100.0	87
Burera	2.6	50.3	46.4	0.7	100.0	71
Gicumbi	3.0	64.2	32.7	0.1	100.0	113
Rwamagana	0.3	97.9	1.4	0.4	100.0	68
Nyagatare	2.8	92.5	1.2	3.5	100.0	84
Gatsibo	1.6	92.0	5.3	1.2	100.0	100
Kayonza	1.9	93.3	0.9	3.9	100.0	70
Kirehe	2.4	94.6	2.7	0.3	100.0	72
Ngoma	0.6	96.4	3.0	0.0	100.0	68
Bugesera	4.1	82.8	11.0	2.2	100.0	80

Source: EICV3.



## Annex B 4 Wall material of the dwelling

EICV3	Wall material						Total	Total no. of HHs (000s)
	Mud bricks	Mud bricks covered with cement	Tree trunks with mud	Tree trunks with mud and cement	Oven fired bricks	Other		
All Rwanda	36.1	18.7	35.2	5.5	2.5	1.9	100.0	2,253
Nyarugenge	9.6	39.9	19.0	23.8	6.6	1.1	100.0	60
Gasabo	8.0	46.4	24.0	12.7	5.2	3.7	100.0	99
Kicukiro	12.5	65.7	6.3	8.5	4.2	2.8	100.0	64
Nyanza	27.8	19.6	43.6	7.8	0.7	0.4	100.0	67
Gisagara	10.2	9.6	70.0	10.1	0.2	0.0	100.0	74
Nyaruguru	11.9	7.7	76.2	3.1	1.2	0.0	100.0	61
Huye	17.1	20.1	46.8	11.5	4.3	0.3	100.0	70
Nyamagabe	12.1	3.4	76.7	6.7	1.0	0.0	100.0	71
Ruhango	56.0	32.9	8.7	1.8	0.4	0.2	100.0	71
Muhanga	66.1	19.3	7.3	0.7	6.6	0.0	100.0	63
Kamonyi	37.5	35.7	19.4	6.5	0.7	0.2	100.0	72
Karongi	76.8	7.7	15.1	0.0	0.4	0.0	100.0	77
Rutsiro	85.4	10.4	3.5	0.0	0.4	0.2	100.0	69
Rubavu	50.8	24.1	12.9	0.3	2.3	9.5	100.0	82
Nyabihu	55.8	14.1	24.6	1.6	1.8	2.1	100.0	68
Ngororero	83.9	9.9	5.8	0.0	0.4	0.0	100.0	74
Rusizi	11.6	2.0	67.6	4.7	7.9	6.3	100.0	78
Nyamasheke	37.2	10.9	37.2	2.1	2.4	10.2	100.0	80
Rulindo	41.8	16.2	33.4	5.5	3.1	0.0	100.0	63
Gakenke	73.7	13.3	9.6	0.0	2.3	1.0	100.0	76
Musanze	32.0	10.2	42.6	3.3	4.4	7.4	100.0	87
Burera	43.5	4.0	43.8	2.4	0.8	5.4	100.0	71
Gicumbi	29.2	19.2	42.0	4.2	5.4	0.0	100.0	113
Rwamagana	11.9	19.6	50.6	13.5	3.5	0.8	100.0	68
Nyagatare	52.2	32.8	10.3	2.1	2.5	0.1	100.0	84
Gatsibo	25.3	14.5	50.7	9.0	0.5	0.0	100.0	100
Kayonza	25.7	14.0	51.4	7.9	0.5	0.5	100.0	70
Kirehe	38.6	7.3	47.3	5.2	0.7	0.9	100.0	72
Ngoma	4.7	2.3	83.7	7.6	1.7	0.0	100.0	68
Bugesera	38.9	27.1	27.0	5.9	0.3	0.9	100.0	80

Source: EICV3.

## Annex B 5 Floor material of the dwelling

EICV3	Floor material					Total	Total no. of HHs (000s)
	Beaten earth	Cement	Bricks	Hardened dung	Other		
All Rwanda	78.4	17.1	1.5	2.2	0.8	100.0	2,253
Nyarugenge	30.9	66.0	1.3	0.5	1.3	100.0	60
Gasabo	43.1	50.3	0.2	0.7	5.7	100.0	99
Kicukiro	25.3	69.3	0.9	0.0	4.6	100.0	64
Nyanza	83.7	13.4	1.2	1.3	0.4	100.0	67
Gisagara	84.8	9.3	4.6	1.0	0.2	100.0	74
Nyaruguru	86.9	7.4	2.2	3.5	0.0	100.0	61
Huye	72.2	19.7	5.3	2.4	0.5	100.0	70
Nyamagabe	91.1	7.8	1.1	0.0	0.0	100.0	71
Ruhango	79.8	15.3	4.3	0.5	0.0	100.0	71
Muhanga	79.7	14.4	5.5	0.4	0.0	100.0	63
Kamonyi	78.1	20.6	0.4	0.0	0.8	100.0	72
Karongi	91.4	6.4	1.9	0.0	0.4	100.0	77
Rutsiro	88.7	4.1	6.3	0.4	0.4	100.0	69
Rubavu	74.5	22.1	1.4	0.2	1.7	100.0	82
Nyabihu	89.2	10.8	0.0	0.0	0.0	100.0	68
Ngororero	93.8	4.7	1.3	0.0	0.2	100.0	74
Rusizi	83.0	12.8	3.0	0.0	1.2	100.0	78
Nyamasheke	86.7	9.3	2.5	0.0	1.4	100.0	80
Rulindo	86.0	12.3	1.0	0.2	0.4	100.0	63
Gakenke	91.2	5.5	1.9	0.0	1.4	100.0	76
Musanze	85.1	14.5	0.0	0.0	0.3	100.0	87
Burera	93.9	5.5	0.6	0.0	0.0	100.0	71
Gicumbi	83.5	15.4	0.0	0.2	0.9	100.0	113
Rwamagana	72.9	21.0	0.4	5.6	0.0	100.0	68
Nyagatare	76.5	18.6	0.2	4.7	0.0	100.0	84
Gatsibo	82.0	13.1	0.0	4.9	0.0	100.0	100
Kayonza	81.8	13.9	0.0	3.8	0.5	100.0	70
Kirehe	76.1	5.3	0.1	18.3	0.2	100.0	72
Ngoma	72.3	8.5	0.9	18.1	0.2	100.0	68
Bugesera	81.6	17.7	0.5	0.2	0.0	100.0	80

Source: EICV3.

## Annex B 6 % of HHs and % of population with access to improved sanitation facilities

EICV3	Total improved sanitation	Improved sanitation		Pit latrine without slab	Other	No toilet facilities	Total no. of HHs (000s)
		Flush toilet	Pit latrine with solid slab				
All Rwanda	74.5	1.7	72.8	19.4	0.0	6.1	2,253
Nyarugenge	92.0	7.1	84.9	6.9	0.2	0.8	60
Gasabo	74.3	7.1	67.2	23.6	0.0	2.1	99
Kicukiro	89.0	10.5	78.5	9.8	0.0	1.3	64
Nyanza	88.6	0.8	87.8	6.5	0.0	5.0	67
Gisagara	44.4	0.2	44.2	47.1	0.0	8.4	74
Nyaruguru	51.2	0.2	50.9	44.3	0.0	4.5	61
Huye	54.7	2.8	51.9	40.4	0.0	4.9	70
Nyamagabe	70.2	0.0	70.2	19.7	0.0	10.0	71
Ruhango	72.9	0.6	72.3	19.8	0.0	7.3	71
Muhanga	76.0	0.5	75.5	22.2	0.0	1.8	63
Kamonyi	72.3	0.0	72.3	23.4	0.0	4.2	72
Karongi	76.6	0.1	76.4	15.4	0.0	8.1	77
Rutsiro	63.4	1.3	62.0	24.8	0.3	11.6	69
Rubavu	80.1	2.3	77.8	4.1	0.2	15.6	82
Nyabihu	70.4	1.8	68.6	20.7	0.0	8.9	68
Ngororero	90.2	0.0	90.2	5.4	0.0	4.4	74
Rusizi	85.1	1.6	83.5	12.6	0.0	2.3	78
Nyamasheke	85.9	0.2	85.7	7.5	0.0	6.7	80
Rulindo	82.6	0.0	82.6	14.3	0.0	3.1	63
Gakenke	86.2	0.4	85.7	8.9	0.0	5.0	76
Musanze	51.7	3.2	48.5	39.7	0.0	8.5	87
Burera	78.4	0.2	78.2	17.2	0.0	4.4	71
Gicumbi	76.0	4.2	71.8	13.0	0.2	10.8	113
Rwamagana	62.0	1.1	60.8	35.2	0.0	2.8	68
Nyagatare	92.8	0.8	91.9	2.6	0.0	4.6	84
Gatsibo	67.4	0.0	67.4	29.6	0.0	3.0	100
Kayonza	66.3	0.3	66.0	27.8	0.0	5.9	70
Kirehe	75.2	0.1	75.0	16.2	0.0	8.6	72
Ngoma	78.7	1.1	77.6	14.3	0.0	7.1	68
Bugesera	80.5	0.7	79.8	11.4	0.2	7.9	80

Source: EICV3.

## Annex B 7 Waste management facilities

EICV3	Methods of HH rubbish disposal							Total	Total no. of HHs (000s)
	Compost heap	Thrown in bushes or fields	Rubbish collection service	Dumped in river or lake	Publicly managed refuse area	Burnt	Other		
All Rwanda	59.4	31.1	5.0	2.5	1.9	0.0	0.1	100.0	2,253
Nyarugenge	16.9	24.1	56.2	1.3	1.5	0.0	0.0	100.0	60
Gasabo	23.1	39.2	33.4	2.2	2.2	0.0	0.0	100.0	99
Kicukiro	20.0	33.1	44.2	1.9	0.6	0.2	0.0	100.0	64
Nyanza	54.9	40.7	0.0	1.1	3.3	0.0	0.0	100.0	67
Gisagara	70.0	26.5	0.0	2.4	1.1	0.0	0.0	100.0	74
Nyaruguru	59.8	37.4	0.0	1.1	1.7	0.0	0.0	100.0	61
Huye	67.3	27.2	0.6	1.9	2.9	0.0	0.0	100.0	70
Nyamagabe	59.5	38.9	0.2	1.0	0.2	0.0	0.2	100.0	71
Ruhango	60.3	34.4	0.0	1.4	3.9	0.0	0.0	100.0	71
Muhanga	72.3	25.7	0.4	0.3	1.3	0.0	0.0	100.0	63
Kamonyi	62.6	30.6	0.0	5.8	0.9	0.0	0.0	100.0	72
Karongi	53.6	41.4	0.0	3.7	1.2	0.0	0.0	100.0	77
Rutsiro	62.7	31.5	0.0	3.7	1.6	0.0	0.4	100.0	69
Rubavu	30.6	52.1	10.4	1.9	5.1	0.0	0.0	100.0	82
Nyabihu	52.8	37.3	0.0	7.3	2.6	0.0	0.0	100.0	68
Ngororero	56.1	38.5	0.0	3.0	2.4	0.0	0.0	100.0	74
Rusizi	71.7	19.8	0.7	1.9	6.0	0.0	0.0	100.0	78
Nyamasheke	70.6	25.5	0.0	1.4	1.7	0.0	0.8	100.0	80
Rulindo	69.9	28.6	0.2	0.6	0.6	0.0	0.0	100.0	63
Gakenke	65.6	31.3	0.0	2.9	0.2	0.0	0.0	100.0	76
Musanze	57.4	38.9	0.9	2.1	0.3	0.0	0.4	100.0	87
Burera	72.8	23.8	0.0	3.0	0.4	0.0	0.0	100.0	71
Gicumbi	69.8	22.4	0.8	4.4	2.6	0.0	0.0	100.0	113
Rwamagana	73.0	23.2	0.3	2.1	1.2	0.0	0.2	100.0	68
Nyagatare	69.6	18.7	4.3	4.0	2.5	0.0	0.8	100.0	84
Gatsibo	65.4	31.5	0.5	2.5	0.0	0.0	0.0	100.0	100
Kayonza	66.4	28.1	0.0	4.2	1.2	0.0	0.0	100.0	70
Kirehe	79.9	16.6	0.0	0.6	2.9	0.0	0.0	100.0	72
Ngoma	78.0	17.5	0.0	3.4	1.0	0.0	0.0	100.0	68
Bugesera	49.5	46.2	0.8	1.1	2.4	0.0	0.0	100.0	80

Source: EICV3.

## Annex B 8 Primary fuel used for lighting

EICV3	Primary source of lighting							Total	Total no. of HHs (000s)
	Electricity distributors	Oil lamp	Firewood	Candle	Lantern	Battery	Other		
All Rwanda	10.8	9.7	8.8	5.9	34.7	28.6	1.5	100.0	2,253
Nyarugenge	61.6	9.2	1.0	11.7	13.8	2.1	0.6	100.0	60
Gasabo	47.3	8.1	1.2	15.2	15.6	10.8	1.8	100.0	99
Kicukiro	63.0	12.4	0.0	9.6	11.0	3.5	0.6	100.0	64
Nyanza	2.9	9.7	4.2	2.2	52.6	27.4	1.2	100.0	67
Gisagara	0.3	4.0	14.7	2.4	29.4	48.9	0.4	100.0	74
Nyaruguru	0.7	4.4	43.0	7.8	14.3	28.6	1.1	100.0	61
Huye	8.3	7.5	9.7	5.6	46.7	22.2	0.0	100.0	70
Nyamagabe	2.7	7.6	24.9	9.1	19.6	30.6	5.5	100.0	71
Ruhango	2.6	10.7	8.0	1.5	57.0	19.6	0.6	100.0	71
Muhanga	5.5	4.9	4.5	1.7	56.8	26.3	0.3	100.0	63
Kamonyi	3.5	8.2	1.4	1.7	64.1	18.6	2.3	100.0	72
Karongi	2.8	9.4	27.3	5.4	18.7	33.7	2.6	100.0	77
Rutsiro	0.4	9.6	12.1	8.8	22.4	44.0	2.8	100.0	69
Rubavu	21.0	10.8	5.3	12.0	22.6	26.8	1.5	100.0	82
Nyabihu	10.0	6.5	15.6	6.6	33.7	26.5	1.2	100.0	68
Ngororero	0.4	9.9	19.1	2.3	27.5	40.6	0.2	100.0	74
Rusizi	13.5	33.2	6.5	3.0	16.9	24.8	2.1	100.0	78
Nyamasheke	7.7	22.1	13.8	4.2	24.9	25.8	1.5	100.0	80
Rulindo	2.6	6.9	5.0	10.2	23.1	50.9	1.3	100.0	63
Gakenke	1.0	4.8	9.9	2.1	29.9	52.0	0.4	100.0	76
Musanze	14.5	2.1	6.1	5.6	40.7	30.4	0.7	100.0	87
Burera	3.2	6.0	14.2	7.0	31.8	36.7	1.2	100.0	71
Gicumbi	8.9	5.3	9.0	9.8	27.2	37.2	2.5	100.0	113
Rwamagana	9.8	18.9	0.4	5.1	44.4	19.3	2.1	100.0	68
Nyagatare	11.0	16.1	2.1	4.0	25.3	40.7	0.8	100.0	84
Gatsibo	2.5	6.9	0.9	5.6	41.3	41.7	1.1	100.0	100
Kayonza	7.5	7.5	2.3	1.7	69.8	10.5	0.7	100.0	70
Kirehe	1.6	9.0	0.9	1.5	64.8	21.9	0.4	100.0	72
Ngoma	3.4	5.2	1.7	1.3	76.1	11.7	0.6	100.0	68
Bugesera	4.3	13.8	5.8	7.4	31.9	31.9	4.8	100.0	80

Source: EICV3.

## Annex B 9 Primary fuel used for cooking

EICV3	Primary source of cooking fuel				Total	Total no. of HHs (000s)
	Firewood	Charcoal	Crop waste	Other		
All Rwanda	86.3	10.6	2.3	0.8	100.0	2,253
Nyarugenge	23.2	70.7	0.2	5.9	100.0	60
Gasabo	43.5	53.7	0.0	2.8	100.0	99
Kicukiro	20.7	77.2	0.0	2.1	100.0	64
Nyanza	96.3	2.8	0.7	0.2	100.0	67
Gisagara	99.3	0.2	0.4	0.0	100.0	74
Nyaruguru	99.8	0.0	0.0	0.2	100.0	61
Huye	93.3	5.9	0.1	0.7	100.0	70
Nyamagabe	96.8	2.6	0.4	0.2	100.0	71
Ruhango	76.4	1.4	21.4	0.8	100.0	71
Muhanga	95.8	2.5	1.3	0.5	100.0	63
Kamonyi	96.2	3.8	0.0	0.0	100.0	72
Karongi	97.9	2.0	0.0	0.1	100.0	77
Rutsiro	99.2	0.6	0.0	0.2	100.0	69
Rubavu	73.9	25.5	0.0	0.6	100.0	82
Nyabihu	88.7	10.5	0.0	0.7	100.0	68
Ngororero	98.8	1.2	0.0	0.0	100.0	74
Rusizi	91.0	8.8	0.2	0.0	100.0	78
Nyamasheke	97.2	2.8	0.0	0.0	100.0	80
Rulindo	86.0	0.4	13.6	0.0	100.0	63
Gakenke	99.4	0.6	0.0	0.0	100.0	76
Musanze	88.4	11.1	0.2	0.3	100.0	87
Burera	90.2	1.3	8.1	0.4	100.0	71
Gicumbi	90.4	6.1	1.3	2.2	100.0	113
Rwamagana	88.4	10.3	0.5	0.8	100.0	68
Nyagatare	75.4	7.2	17.1	0.3	100.0	84
Gatsibo	94.7	1.4	3.3	0.6	100.0	100
Kayonza	92.7	6.7	0.0	0.5	100.0	70
Kirehe	98.5	1.5	0.0	0.0	100.0	72
Ngoma	97.3	1.7	0.6	0.3	100.0	68
Bugesera	96.3	1.9	0.0	1.8	100.0	80

Source: EICV3.

## Annex B 10 % of HHs with access to improved drinking water

EICV3	Total improved water source	Improved water sources						Total no. of HHs (oos)					
		Protected spring	Public stand pipe	Piped into dwelling/ yard	Bore hole	Protected well	Rain water	Surface water (river or lake)	Unprotected spring	Unprotected well	Tanker truck	Other	
All Rwanda	74.2	38.1	25.7	5.9	1.8	2.3	0.4	11.6	10.6	2.3	0.0	1.3	2,253
Nyarugenge	94.0	1.8	47.0	39.4	3.9	1.9	0.0	0.9	1.7	0.5	0.0	3.0	60
Gasabo	84.7	16.7	36.9	24.0	2.2	4.8	0.0	6.5	7.1	1.7	0.0	0.0	99
Kicukiro	69.0	7.3	20.7	39.3	0.2	1.2	0.3	4.5	0.3	0.0	0.0	26.2	64
Nyanza	82.1	62.3	15.5	1.8	1.0	1.5	0.0	15.1	2.7	0.0	0.0	0.0	67
Gisagara	82.1	61.8	17.3	0.0	0.0	2.9	0.0	9.9	6.1	2.0	0.0	0.0	74
Nyaruguru	66.1	44.4	14.7	0.7	0.0	6.3	0.0	6.7	21.5	5.5	0.2	0.0	61
Huye	91.0	63.7	17.0	6.7	0.0	3.7	0.0	3.5	3.1	2.0	0.0	0.4	70
Nyamagabe	68.4	50.9	8.5	2.5	0.0	6.5	0.0	9.9	17.4	3.7	0.0	0.6	71
Ruhango	58.7	46.5	6.0	0.9	0.0	5.3	0.0	21.7	17.2	2.4	0.0	0.0	71
Muhanga	84.4	64.7	11.6	4.3	0.0	3.8	0.0	4.6	9.1	2.0	0.0	0.0	63
Kamonyi	65.9	43.0	14.9	0.2	0.0	7.8	0.0	16.3	11.4	6.4	0.0	0.0	72
Karongi	74.7	51.7	13.0	1.6	3.1	5.3	0.0	10.3	14.8	0.2	0.0	0.0	77
Rutsiro	59.9	50.3	9.0	0.2	0.3	0.2	0.0	9.6	28.3	0.7	0.0	1.5	69
Rubavu	93.4	14.8	59.6	12.4	0.0	0.0	6.6	5.2	1.2	0.3	0.0	0.0	82
Nyabihu	79.6	52.5	25.6	0.1	0.0	0.8	0.7	5.1	11.3	2.9	0.0	1.1	68
Ngororero	63.7	54.7	8.6	0.0	0.0	0.2	0.2	4.3	30.3	1.7	0.0	0.0	74
Rusizi	72.8	27.4	30.8	6.1	4.1	4.4	0.0	4.4	20.0	2.1	0.0	0.7	78
Nyamasheke	72.6	40.1	28.6	3.4	0.0	0.6	0.0	2.5	23.0	1.8	0.0	0.2	80
Rulindo	74.6	59.7	14.3	0.2	0.2	0.2	0.0	7.8	16.4	1.2	0.0	0.0	63
Gakenke	74.6	57.3	15.8	0.6	0.0	0.9	0.0	6.1	15.9	3.4	0.0	0.0	76
Musanze	74.0	13.8	53.3	6.6	0.0	0.2	0.1	20.9	4.9	0.0	0.0	0.2	87
Burera	76.8	44.0	31.2	0.4	0.0	0.6	0.6	12.6	9.9	0.0	0.0	0.7	71
Gicumbi	89.4	58.9	17.3	9.0	0.4	2.5	1.3	2.6	7.1	0.6	0.0	0.3	113
Rwamagana	82.0	28.4	44.9	6.1	0.0	2.4	0.2	11.9	3.8	1.7	0.0	0.7	68
Nyagatare	42.3	2.2	18.1	3.1	15.4	3.4	0.2	40.6	5.1	5.4	0.0	6.6	84
Gatsibo	72.3	33.8	32.7	0.7	5.1	0.0	0.0	12.1	6.9	8.3	0.4	0.0	100
Kayonza	72.0	26.8	37.1	1.6	5.8	0.8	0.0	22.1	3.2	2.7	0.0	0.0	70
Kirehe	61.5	33.7	27.2	0.2	0.0	0.4	0.0	17.4	17.3	3.8	0.0	0.0	72
Ngoma	67.6	40.7	21.8	1.3	3.7	0.0	0.0	28.1	3.0	1.4	0.0	0.0	68
Bugesera	70.6	4.7	56.2	2.6	5.5	1.6	0.0	24.6	1.2	2.5	0.0	1.1	80

Source: EICV3.

## Annex B 11 Time to improved water source

EICV3	Mean time to improved water source (minutes)	Time to improved water source (minutes)						No improved source	Total	Total no. of HHs (000s)
		Water piped into dwelling/yard	0-4 min	5-14 min	15-29 min	30-59 min	60+ min			
All Rwanda	14.4	5.8	10.2	28.7	16.7	10.3	2.5	25.8	100.0	2,253
Nyarugenge	9.4	39.5	15.8	18.8	6.0	11.1	2.8	6.0	100.0	60
Gasabo	10.5	24.1	13.3	26.8	10.8	6.5	3.3	15.3	100.0	99
Kicukiro	6.2	39.3	4.5	13.1	5.3	6.8	0.0	31.0	100.0	64
Nyanza	13.6	1.9	9.5	36.9	23.5	9.1	1.3	17.9	100.0	67
Gisagara	22.7	0.0	4.7	22.1	28.4	20.7	6.1	17.9	100.0	74
Nyaruguru	14.2	0.7	7.4	30.7	18.5	7.6	1.2	33.9	100.0	61
Huye	13.9	6.7	9.1	34.2	28.1	12.3	0.7	9.0	100.0	70
Nyamagabe	15.7	2.5	6.6	27.4	16.0	14.9	1.1	31.6	100.0	71
Ruhango	12.2	0.9	9.9	29.0	11.9	6.7	0.5	41.3	100.0	71
Muhanga	9.6	4.1	14.9	43.2	18.4	3.1	0.5	15.8	100.0	63
Kamonyi	15.9	0.2	6.9	30.5	14.4	11.4	2.4	34.1	100.0	72
Karongi	14.1	1.6	11.6	33.6	17.9	7.6	2.5	25.3	100.0	77
Rutsiro	17.4	0.2	6.3	23.6	16.8	9.8	3.0	40.4	100.0	69
Rubavu	12.8	12.4	13.9	38.0	16.1	8.6	4.4	6.6	100.0	82
Nyabihu	12.0	0.1	14.0	37.5	21.2	6.9	0.0	20.4	100.0	68
Ngororero	14.4	0.0	5.6	30.4	18.3	8.0	1.5	36.3	100.0	74
Rusizi	10.6	6.1	17.1	30.9	11.4	5.8	1.5	27.2	100.0	78
Nyamasheke	11.9	3.3	8.0	37.4	15.8	7.4	0.6	27.4	100.0	80
Rulindo	14.7	0.2	12.1	28.3	20.3	12.9	1.0	25.4	100.0	63
Gakenke	15.3	0.6	7.5	33.2	20.7	11.3	1.2	25.4	100.0	76
Musanze	9.7	6.5	17.0	27.9	17.3	4.9	0.3	26.0	100.0	87
Burera	18.2	0.4	6.7	28.8	19.9	18.0	3.0	23.2	100.0	71
Gicumbi	20.4	9.0	4.9	25.6	21.8	22.3	5.8	10.5	100.0	113
Rwamagana	14.8	6.1	9.6	31.2	20.5	12.2	2.4	18.0	100.0	68
Nyagatare	17.6	3.1	7.3	12.5	10.0	7.1	2.4	57.7	100.0	84
Gatsibo	14.2	0.7	13.5	29.4	18.8	8.1	1.8	27.7	100.0	100
Kayonza	16.1	1.6	9.7	33.0	14.8	9.1	3.8	28.0	100.0	70
Kirehe	26.0	0.2	7.2	16.9	11.2	16.1	10.0	38.5	100.0	72
Ngoma	16.3	1.4	13.1	27.0	11.5	10.1	4.4	32.5	100.0	68
Bugesera	13.5	2.3	16.2	25.0	14.9	9.7	2.2	29.6	100.0	80

Source: EICV3.



## Annex B 12 % of HHs that have the right to sell or use any of their parcels as a guarantee for a loan

EICV3	% of HHs with the right to sell any land or use it as a guarantee	Total no. of HHs cultivating land for crop production (000s)
All Rwanda	84.0	2,093
Nyarugenge	73.0	25
Gasabo	72.4	68
Kicukiro	63.0	32
Nyanza	84.1	64
Gisagara	77.2	73
Nyaruguru	84.8	60
Huye	86.9	66
Nyamagabe	92.2	70
Ruhango	77.5	69
Muhanga	88.5	62
Kamonyi	88.6	68
Karongi	84.8	75
Rutsiro	89.4	68
Rubavu	65.1	71
Nyabihu	78.5	66
Ngororero	96.0	74
Rusizi	81.8	75
Nyamasheke	92.5	78
Rulindo	93.6	62
Gakenke	94.5	76
Musanze	68.3	85
Burera	98.1	70
Gicumbi	87.6	111
Rwamagana	75.4	64
Nyagatare	79.8	80
Gatsibo	83.6	99
Kayonza	77.9	66
Kirehe	85.1	70
Ngoma	93.8	67
Bugesera	86.4	78

Source: EICV3. Note: Calculated on the basis of HHs cultivating land for crop production.

## Annex B 13 % of HHs cultivating any parcel that was...

EICV3	Inherited	Purchased	Received as gift	Received for free use or as loan	Appropriated	Share-cropped	Leased	Total no. of HHs cultivating land for crop production (000s)
All Rwanda	70.1	44.9	17.1	27.0	1.2	18.2	19.5	2,093
Nyarugenge	45.2	44.0	6.6	24.7	2.0	4.1	8.4	25
Gasabo	46.9	43.6	15.1	30.6	0.8	6.0	10.9	68
Kicukiro	26.1	49.4	8.1	42.0	2.9	2.4	11.8	32
Nyanza	70.9	23.3	13.7	35.3	4.1	6.7	28.5	64
Gisagara	81.8	29.2	14.8	44.6	3.9	29.7	31.8	73
Nyaruguru	83.5	35.2	11.2	34.0	0.8	13.6	39.8	60
Huye	79.0	26.4	12.2	39.7	1.3	32.2	13.6	66
Nyamagabe	85.4	36.8	13.1	26.2	0.7	12.7	20.0	70
Ruhango	66.0	33.2	14.9	46.9	0.9	22.3	20.6	69
Muhanga	88.7	42.2	13.1	29.1	0.8	31.2	7.9	62
Kamonyi	76.9	36.9	12.1	24.2	2.5	18.3	14.3	68
Karongi	81.9	35.7	14.4	22.7	0.1	28.6	18.9	75
Rutsiro	79.4	56.3	13.7	24.1	0.7	26.7	6.6	68
Rubavu	64.3	46.4	12.6	18.2	0.0	12.5	12.4	71
Nyabihu	68.4	48.1	18.1	27.6	0.6	44.0	1.2	66
Ngororero	91.0	47.4	11.1	28.7	1.5	33.5	20.6	74
Rusizi	77.0	44.6	7.1	9.2	0.9	26.8	6.2	75
Nyamasheke	81.6	48.6	14.7	22.8	0.2	43.3	5.0	78
Rulindo	89.6	46.3	10.5	24.3	0.0	20.8	14.3	62
Gakenke	91.1	58.5	8.8	22.7	0.2	27.8	8.6	76
Musanze	83.5	47.8	15.2	20.7	0.6	1.7	31.9	85
Burera	89.4	55.5	10.3	19.9	0.2	6.1	30.1	70
Gicumbi	80.9	44.5	12.6	18.5	0.9	16.9	9.5	111
Rwamagana	59.1	46.6	10.6	23.7	4.1	3.3	22.1	64
Nyagatare	14.5	51.5	36.4	17.0	0.2	11.3	35.7	80
Gatsibo	51.3	62.4	25.2	30.9	1.2	3.7	27.7	99
Kayonza	53.0	49.6	40.8	29.4	1.7	8.7	28.5	66
Kirehe	36.7	49.5	51.3	23.5	0.5	7.4	32.0	70
Ngoma	74.5	50.4	31.6	25.1	0.2	16.8	25.3	67
Bugesera	53.0	47.1	19.0	40.5	3.6	15.1	28.1	78

Source: EICV3. Notes: Calculated on the basis of HHs cultivating land for crop production. Since households can cultivate more than one parcel, percentages do not total 100.

## Annex B 14 Land transactions made during the last 12 months

EICV3	In the last 12 months...									
	% of HHs that bought land	For those, average amount spent	% of HHs that sold land	For those, average amount received	% of HHs that rented out land	For those, average amount received	% of HHs that lent land to others	% of HHs that gave land to others as gift, inheritance, dowry, or otherwise	% of HHs that received land from others as gift, inheritance, dowry, or otherwise	Total no. of HHs (000s)
All Rwanda	14.0	162,168	9.0	177,951	11.70	11,568	15.7	5.4	8.3	2,253
Nyarugenge	4.6	640,754	3.7	519,125	6.60	19,233	19.9	0.8	2.0	60
Gasabo	7.9	329,645	4.5	599,384	8.10	13,486	24.3	1.8	5.0	99
Kicukiro	6.3	428,917	5.1	786,708	3.70	26,745	36.5	1.5	5.4	64
Nyanza	6.7	106,079	5.1	67,504	15.10	10,524	14.3	5.4	8.0	67
Gisagara	13.2	75,394	6.4	95,784	14.10	6,658	14.8	4.2	10.4	74
Nyaruguru	20.4	87,952	10.0	92,064	12.10	6,977	18.2	5.4	8.8	61
Huye	8.2	81,897	6.5	72,945	14.50	8,180	13.8	3.2	4.6	70
Nyamagabe	13.2	85,706	7.6	101,226	14.90	5,982	14.9	7.7	9.9	71
Ruhango	9.0	109,109	5.5	178,903	18.90	8,456	19.3	5.1	4.1	71
Muhanga	16.6	105,815	10.3	120,056	11.50	5,386	19.5	5.2	8.7	63
Kamonyi	15.9	141,357	8.6	135,629	6.90	10,438	9.1	4.7	7.3	72
Karongi	16.2	121,903	7.9	89,381	12.50	5,567	17.6	7.5	9.5	77
Rutsiro	22.5	109,839	14.8	93,094	11.80	10,334	15.2	7.2	14.5	69
Rubavu	8.4	204,462	8.8	283,982	15.00	21,272	11.9	2.4	10.1	82
Nyabihu	16.9	188,633	8.6	141,582	14.60	19,062	9.1	4.7	6.8	68
Ngororero	24.1	128,779	13.7	100,974	14.30	6,874	17.3	9.3	13.6	74
Rusizi	10.5	150,438	7.0	184,675	10.10	13,992	3.4	4.2	4.7	78
Nyamasheke	15.2	139,318	11.6	110,469	10.70	10,220	11.0	5.0	6.7	80
Rulindo	15.3	143,789	8.9	118,116	9.40	6,618	12.9	5.0	10.6	63
Gakenke	25.4	126,413	11.4	77,005	8.60	4,788	17.8	7.5	7.2	76
Musanze	11.7	202,461	8.9	315,819	9.60	22,147	8.5	6.2	5.3	87
Burera	20.9	163,717	12.4	137,466	18.60	21,125	9.4	8.2	7.6	71
Gicumbi	13.8	216,228	11.2	204,124	13.40	5,810	16.9	7.9	8.9	113
Rwamagana	13.9	233,059	12.9	251,106	6.30	12,411	17.6	6.6	11.7	68
Nyagatare	12.8	186,550	8.9	228,932	11.70	19,248	15.5	4.7	7.4	84
Gatsibo	17.8	184,734	10.9	158,421	14.00	10,294	21.8	7.8	10.1	100
Kayonza	14.9	220,962	8.2	210,301	7.30	12,067	13.5	3.5	8.3	70
Kirehe	10.0	209,762	5.3	172,778	12.30	13,467	11.6	5.8	7.8	72
Ngoma	13.7	123,329	10.3	120,427	10.60	11,199	14.4	7.1	12.6	68
Bugesera	15.4	163,961	14.3	177,612	11.90	9,662	19.4	5.7	11.8	80

Source: EICV3. Note: all average amounts presented are in RWF at prices during the time of the respective survey (undeflated).

## Annex B 15 % of HHs exposed to LTR, and current stage of the process

EICV3	% of HHs exposed to LTR	Of those exposed, current stage of the process									Total no. of HHs exposed (000s)
		Demar-cation	Adjudi-cation	Claims receipt issued	Recor-ding objections	Public-ation of records	Mediat-ion period	Regis-tration	Title issued	Total	
All Rwanda	54.1	3.1	11.8	46.3	0.3	0.0	0.6	33.1	4.8	100.0	1,218
Nyarugenge	56.3	1.3	18.2	3.4	0.0	0.0	0.4	50.7	26.1	100.0	34
Gasabo	64.9	4.1	17.1	60.3	0.4	0.6	0.0	4.9	12.6	100.0	64
Kicukiro	47.2	9.0	10.2	35.8	0.0	0.0	0.0	24.1	20.9	100.0	30
Nyanza	67.0	0.0	0.0	2.8	0.0	0.0	0.0	97.2	0.0	100.0	45
Gisagara	54.7	0.0	3.4	18.8	0.8	0.0	0.0	77.0	0.0	100.0	40
Nyaruguru	46.7	4.8	0.4	94.8	0.0	0.0	0.0	0.0	0.0	100.0	28
Huye	65.5	0.0	0.6	99.4	0.0	0.0	0.0	0.0	0.0	100.0	46
Nyamagabe	60.0	1.4	0.0	98.6	0.0	0.0	0.0	0.0	0.0	100.0	43
Ruhango	47.3	2.8	10.0	81.8	0.0	0.0	0.0	4.0	1.3	100.0	34
Muhanga	52.3	2.3	39.3	52.9	0.0	0.0	3.8	1.7	0.0	100.0	33
Kamonyi	48.4	3.2	48.1	35.6	0.0	0.0	0.0	11.9	1.3	100.0	35
Karongi	33.4	3.2	5.9	83.5	0.0	0.0	0.0	0.0	7.4	100.0	26
Rutsiro	51.1	22.3	28.1	33.4	0.0	0.0	0.0	12.4	3.8	100.0	35
Rubavu	53.0	0.0	9.5	85.8	0.3	0.3	0.0	2.8	1.2	100.0	43
Nyabihu	41.0	0.0	5.1	8.4	0.0	0.0	0.0	83.8	2.7	100.0	28
Ngororero	41.7	12.9	52.2	9.7	6.7	0.0	0.0	17.7	0.9	100.0	31
Rusizi	40.2	0.6	0.9	93.1	0.0	0.0	0.0	4.8	0.5	100.0	31
Nyamasheke	42.6	0.0	0.0	96.2	0.0	0.0	3.8	0.0	0.0	100.0	34
Rulindo	51.8	6.3	19.2	64.9	0.0	0.0	0.0	5.7	3.8	100.0	33
Gakenke	46.8	2.3	3.1	79.4	0.0	0.0	0.0	9.9	5.3	100.0	36
Musanze	69.8	2.1	63.8	26.1	0.0	0.0	0.0	1.1	6.9	100.0	61
Burera	61.3	2.7	2.3	2.0	0.0	0.0	0.0	93.0	0.0	100.0	44
Gicumbi	48.5	14.0	10.3	53.3	1.8	0.0	0.0	20.6	0.0	100.0	55
Rwamagana	49.0	4.0	4.1	83.7	0.0	0.0	0.5	4.5	3.2	100.0	33
Nyagatare	48.2	0.0	0.0	0.4	0.0	0.0	0.0	99.6	0.0	100.0	40
Gatsibo	54.1	0.0	0.2	1.9	0.3	0.0	1.2	96.4	0.0	100.0	54
Kayonza	49.9	0.0	0.7	99.3	0.0	0.0	0.0	0.0	0.0	100.0	35
Kirehe	96.5	0.3	0.0	0.0	0.0	0.0	0.0	71.7	28.0	100.0	69
Ngoma	63.3	0.0	1.0	0.3	0.0	0.0	0.0	98.7	0.0	100.0	43
Bugesera	69.1	0.4	1.4	63.3	0.3	0.0	6.2	26.7	1.8	100.0	55

Source: EICV3. Note: Stage of process calculated on the basis of those HHs exposed.

## Annex B 16 % of HHs incurring expenditure on fertilisers (inorganic and organic)

EICV3	Chemical fertiliser	Organic fertiliser	Total no. of HHscultivating land for crop production (000s)
All Rwanda	28.9	9.3	2,093
Nyarugenge	2.2	4.3	25
Gasabo	13.9	6.2	68
Kicukiro	10.4	3.4	32
Nyanza	9.1	4.8	64
Gisagara	27.2	7.4	73
Nyaruguru	42.1	15.5	60
Huye	31.2	11.7	66
Nyamagabe	36.7	13.9	70
Ruhango	13.3	7.4	69
Muhanga	30.3	11.9	62
Kamonyi	21.2	5.2	68
Karongi	38.9	5.8	75
Rutsiro	27.5	12.8	68
Rubavu	32.7	1.5	71
Nyabihu	61.6	14.1	66
Ngororero	28.6	13.7	74
Rusizi	31.6	11.5	75
Nyamasheke	41.5	13.6	78
Rulindo	37.3	19.8	62
Gakenke	62.9	17.4	76
Musanze	46.5	12.8	85
Burera	41.6	16.2	70
Gicumbi	16.5	10.8	111
Rwamagana	30.5	11.5	64
Nyagatare	10.5	0.9	80
Gatsibo	10.5	6.7	99
Kayonza	12.8	2.4	66
Kirehe	52.4	4.0	70
Ngoma	22.6	4.8	67
Bugesera	8.8	3.1	78

Source: EICV3. Note: Calculated on the basis of HHs cultivating land for crop production.

## Annex B 17 % of HHs accessing formal sources of credit using land as collateral

EICV3	% of HHs with a loan from a formal source	Of those, % of HHs that used land as a collateral to access the loan	Total no. of HHs accessing formal sources of credit (000s)
All Rwanda	9.8	33.8	220
Nyarugenge	16.1	9.9	10
Gasabo	15.7	13.0	16
Kicukiro	17.1	5.7	11
Nyanza	7.5	36.0	5
Gisagara	2.7	45.9	2
Nyaruguru	5.9	36.8	4
Huye	8.1	22.4	6
Nyamagabe	7.6	43.3	5
Ruhango	9.7	46.7	7
Muhanga	8.4	47.8	5
Kamonyi	11.1	47.5	8
Karongi	6.6	49.8	5
Rutsiro	5.8	23.8	4
Rubavu	13.2	45.7	11
Nyabihu	6.9	21.3	5
Ngororero	10.2	24.9	8
Rusizi	10.0	48.6	8
Nyamasheke	8.7	24.0	7
Rulindo	11.7	54.6	7
Gakenke	6.6	52.8	5
Musanze	7.8	29.0	7
Burera	8.1	54.2	6
Gicumbi	9.8	32.0	11
Rwamagana	11.4	49.5	8
Nyagatare	8.1	21.9	7
Gatsibo	9.0	56.1	9
Kayonza	11.1	41.9	8
Kirehe	14.6	20.8	10
Ngoma	9.7	52.4	7
Bugesera	13.3	20.3	11

Source: EICV3. Note: Formal sources of credit are state bank, commercial bank or credit cooperative.

## Annex B 18 Problems resulting from environmental destruction

EICV3	Problems resulting from environmental destruction										Total no. of HHs (000s)
	No major problem	Floods	Erosion	Reduction in agricultural production	Climatic change	Famine/drought	Destructive rains	Loss of soil fertility	Other	Total	
All Rwanda	66.1	0.9	8.2	9.2	5.0	3.4	5.6	1.2	0.3	100.0	2,253
Nyarugenge	93.7	0.0	1.4	1.3	0.0	0.5	2.9	0.0	0.2	100.0	60
Gasabo	92.2	0.0	2.6	0.3	1.1	0.0	3.2	0.0	0.5	100.0	99
Kicukiro	88.2	0.2	6.1	3.1	1.1	0.0	0.7	0.0	0.6	100.0	64
Nyanza	76.8	0.6	5.9	1.2	8.6	2.9	4.0	0.0	0.0	100.0	67
Gisagara	81.6	2.0	3.0	3.1	0.0	4.6	5.5	0.2	0.0	100.0	74
Nyaruguru	61.8	1.2	5.5	19.0	4.9	4.7	2.9	0.0	0.0	100.0	61
Huye	20.9	0.0	10.7	35.4	16.3	7.1	9.5	0.2	0.0	100.0	70
Nyamagabe	69.3	0.0	9.3	6.2	4.7	1.9	4.5	3.2	0.9	100.0	71
Ruhango	37.2	0.7	13.9	24.5	6.1	8.1	8.1	0.2	1.1	100.0	71
Muhanga	73.3	2.5	12.5	0.3	1.2	1.1	8.5	0.6	0.0	100.0	63
Kamonyi	55.7	0.8	5.7	5.9	24.3	4.7	2.7	0.2	0.0	100.0	72
Karongi	64.3	0.0	12.5	4.0	3.0	1.7	11.8	1.8	1.0	100.0	77
Rutsiro	52.0	0.7	18.7	14.7	3.5	0.6	5.9	3.0	1.0	100.0	69
Rubavu	86.7	0.9	5.0	0.6	0.2	0.0	6.0	0.2	0.4	100.0	82
Nyabihu	8.4	3.0	40.6	29.4	6.3	0.3	5.6	6.1	0.2	100.0	68
Ngororero	81.0	0.6	11.3	0.9	0.2	0.0	4.0	2.0	0.0	100.0	74
Rusizi	74.0	0.8	5.2	10.3	2.1	0.4	5.8	1.5	0.0	100.0	78
Nyamasheke	75.8	0.0	5.6	5.9	1.3	0.0	9.0	2.5	0.0	100.0	80
Rulindo	81.1	0.6	5.1	2.3	0.8	0.0	8.6	1.3	0.2	100.0	63
Gakenke	83.0	1.0	12.8	0.4	0.2	0.0	2.6	0.0	0.0	100.0	76
Musanze	61.6	4.1	14.3	6.0	2.3	0.0	8.9	2.5	0.2	100.0	87
Burera	61.0	0.2	23.9	7.6	4.0	0.0	2.7	0.2	0.2	100.0	71
Gicumbi	77.0	0.3	5.7	4.0	0.5	0.2	9.8	1.4	1.2	100.0	113
Rwamagana	50.2	1.0	1.2	25.0	12.7	3.5	4.6	1.3	0.2	100.0	68
Nyagatare	58.5	0.8	2.4	20.8	9.4	2.1	5.6	0.2	0.0	100.0	84
Gatsibo	91.2	0.0	2.5	2.6	1.4	0.2	1.4	0.5	0.1	100.0	100
Kayanza	65.8	0.0	1.4	6.9	19.4	2.6	1.1	2.9	0.0	100.0	70
Kirehe	34.3	0.4	2.5	21.4	7.0	29.7	3.3	1.3	0.2	100.0	72
Ngoma	64.7	0.7	3.9	7.2	2.2	2.9	15.4	2.7	0.3	100.0	68
Bugesera	39.2	5.0	1.4	14.4	12.1	24.5	2.3	0.0	1.1	100.0	80

Source: EICV3.

## Annex B Confidence intervals for selected indicators, EICV3

### Annex B 1 % of HHs living in *Imidugudu*

	Estimate	Standard error	Lower	Upper	Unweighted count
All Rwanda	37.45	0.86	35.77	39.13	14,308
Kigali City	7.76	2.04	3.76	11.76	1,348
Southern Province	18.22	1.1	16.07	20.38	3,840
Western Province	25.46	1.75	22.03	28.89	3,360
Northern Province	38.36	2.12	34.19	42.52	2,400
Eastern Province	80.17	1.93	76.39	83.96	3,360
Kigali City Urban	9.13	2.41	4.4	13.85	1,177
Kigali City Rural	1.1	0.75	-0.37	2.57	171
Southern Province Urban	8.17	2.88	2.51	13.82	492
Southern Province Rural	19.65	1.22	17.26	22.03	3,348
Western Province Urban	28.53	6.26	16.25	40.81	204
Western Province Rural	25.25	1.84	21.64	28.86	3,156
Northern Province Urban	22.04	8.61	5.14	38.93	132
Northern Province Rural	39.37	2.2	35.04	43.69	2,268
Eastern Province Urban	62.44	12.01	38.89	86	144
Eastern Province Rural	80.86	1.95	77.04	84.68	3,216
Urban	15.08	2.03	11.1	19.06	2,149
Rural	41.31	0.99	39.38	43.24	12,159
Q1	33.05	1.36	30.38	35.71	2,449
Q2	39.23	1.2	36.87	41.58	2,699
Q3	40.1	1.26	37.64	42.56	2,849
Q4	40.87	1.27	38.38	43.36	3,103
Q5	33.76	1.64	30.54	36.98	3,208
Nyarugenge	6.51	3.24	0.15	12.88	449
Gasabo	11.16	3.93	3.45	18.88	450
Kicukiro	3.62	2.12	-0.55	7.78	449
Nyanza	4.11	1.37	1.43	6.79	480
Gisagara	29.59	4.63	20.51	38.67	480
Nyaruguru	52.89	4.18	44.7	61.09	480
Huye	14.2	3.2	7.91	20.49	480
Nyamagabe	4.6	2.37	-0.05	9.24	480
Ruhango	6.29	1.95	2.47	10.11	480
Muhanga	5.62	1.53	2.62	8.63	480
Kamonyi	30.6	3.58	23.58	37.62	480
Karongi	5.84	1.88	2.15	9.53	480
Rutsiro	53.46	4.88	43.88	63.04	480
Rubavu	40.01	6.32	27.61	52.41	480
Nyabihu	20.71	4.14	12.59	28.84	480
Ngororero	8.54	2.7	3.25	13.83	480
Rusizi	28.69	3.71	21.4	35.97	480
Nyamasheke	21.95	4.92	12.29	31.61	480
Rulindo	23.65	3.41	16.97	30.33	480
Gakenke	71.01	3.66	63.83	78.19	480
Musanze	25.76	5.53	14.91	36.61	480



Burera	43.21	3.71	35.93	50.49	480
Gicumbi	31.14	4.41	22.49	39.79	480
Rwamagana	71.2	4.04	63.28	79.12	480
Nyagatare	64.31	5.92	52.7	75.92	480
Gatsibo	81.49	7.53	66.73	96.26	480
Kayonza	88.74	3.14	82.58	94.89	480
Kirehe	94.52	2.49	89.65	99.4	480
Ngoma	97.89	0.87	96.19	99.6	480
Bugesera	67.35	3.8	59.9	74.81	480

## Annex B 2 % of HHs whose main water source is improved

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	74.2	0.88	72.47	75.93	14,308
Kigali City	82.7	2.04	78.69	86.71	1,348
Southern Province	74.78	1.39	72.05	77.5	3,840
Western Province	74.16	1.67	70.88	77.44	3,360
Northern Province	78.94	2.09	74.84	83.03	2,400
Eastern Province	66.57	2.34	61.97	71.17	3,360
Kigali City Urban	83.7	2.15	79.47	87.92	1,177
Kigali City Rural	77.84	5.56	66.93	88.74	171
Southern Province Urban	88.27	3.38	81.64	94.91	492
Southern Province Rural	72.87	1.53	69.86	75.87	3,348
Western Province Urban	89.99	3.64	82.84	97.14	204
Western Province Rural	73.08	1.76	69.62	76.54	3,156
Northern Province Urban	92.17	5.31	81.75	102.58	132
Northern Province Rural	78.12	2.2	73.81	82.42	2,268
Eastern Province Urban	92.46	4.01	84.6	100.32	144
Eastern Province Rural	65.57	2.42	60.82	70.31	3,216
Urban	86.42	1.53	83.43	89.42	2,149
Rural	72.1	1.01	70.12	74.07	12,159
Q1	68.43	1.44	65.6	71.25	2,449
Q2	71.42	1.27	68.93	73.91	2,699
Q3	71.5	1.25	69.05	73.95	2,849
Q4	73.18	1.2	70.83	75.53	3,103
Q5	83.96	0.98	82.04	85.89	3,208
Nyarugenge	94.02	1.87	90.34	97.69	449
Gasabo	84.68	3.63	77.56	91.81	450
Kicukiro	68.95	4.01	61.09	76.81	449
Nyanza	82.09	4.13	73.98	90.2	480
Gisagara	82.06	3.63	74.94	89.19	480
Nyaruguru	66.08	4.03	58.17	73.99	480
Huye	91.05	2.19	86.76	95.34	480
Nyamagabe	68.38	3.93	60.68	76.08	480
Ruhango	58.73	4.86	49.19	68.27	480
Muhanga	84.38	3.12	78.26	90.51	480
Kamonyi	65.9	4.39	57.28	74.51	480

Karongi	74.72	6.24	62.48	86.97	480
Rutsiro	59.88	4.26	51.53	68.23	480
Rubavu	93.37	2.38	88.69	98.05	480
Nyabihu	79.64	4.07	71.67	87.62	480
Ngororero	63.75	4.08	55.75	71.74	480
Rusizi	72.82	4.48	64.04	81.61	480
Nyamasheke	72.57	4.39	63.96	81.19	480
Rulindo	74.63	3.77	67.23	82.03	480
Gakenke	74.6	3.89	66.98	82.22	480
Musanze	73.96	5.61	62.95	84.97	480
Burera	76.82	4.82	67.37	86.27	480
Gicumbi	89.42	2.96	83.61	95.24	480
Rwamagana	81.96	4.5	73.12	90.79	480
Nyagatare	42.31	5.09	32.33	52.29	480
Gatsibo	72.3	6.01	60.51	84.09	480
Kayonza	72.04	6.55	59.19	84.89	480
Kirehe	61.51	7.28	47.23	75.79	480
Ngoma	67.56	6.65	54.51	80.61	480
Bugesera	70.64	5.59	59.67	81.61	480

*Table B.1 % of HHs with improved sanitation*

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	74.47	0.52	73.45	75.5	14,308
Kigali City	83.28	2.05	79.25	87.31	1,348
Southern Province	66.19	0.93	64.36	68.02	3,840
Western Province	79.2	0.93	77.36	81.03	3,360
Northern Province	74.17	1.5	71.23	77.11	2,400
Eastern Province	74.87	1	72.9	76.84	3,360
Kigali City Urban	88.12	2.01	84.18	92.06	1,177
Kigali City Rural	59.75	6.03	47.91	71.58	171
Southern Province Urban	74.32	3.41	67.62	81.02	492
Southern Province Rural	65.04	1	63.08	67	3,348
Western Province Urban	78.09	3.64	70.95	85.23	204
Western Province Rural	79.27	0.97	77.37	81.17	3,156
Northern Province Urban	74.63	6.27	62.33	86.93	132
Northern Province Rural	74.14	1.55	71.11	77.17	2,268
Eastern Province Urban	76.71	6.04	64.86	88.55	144
Eastern Province Rural	74.8	1.03	72.77	76.83	3,216
Urban	82.59	1.5	79.64	85.54	2,149
Rural	73.07	0.56	71.98	74.17	12,159
Q1	64.72	1.11	62.53	66.9	2,449
Q2	72.12	1.02	70.11	74.13	2,699
Q3	71.85	1.01	69.88	73.83	2,849
Q4	74.66	1.01	72.68	76.63	3,103
Q5	85.61	0.9	83.84	87.37	3,208
Nyarugenge	92.05	2.04	88.04	96.05	449
Gasabo	74.31	3.99	66.47	82.14	450

Kicukiro	88.98	2.86	83.37	94.6	449
Nyanza	88.56	1.62	85.38	91.75	480
Gisagara	44.42	2.89	38.76	50.08	480
Nyaruguru	51.19	2.69	45.91	56.47	480
Huye	54.69	3.29	48.24	61.13	480
Nyamagabe	70.24	2.32	65.69	74.78	480
Ruhango	72.91	2.19	68.61	77.21	480
Muhanga	75.98	3.07	69.95	82.01	480
Kamonyi	72.33	2.44	67.55	77.12	480
Karongi	76.55	2.3	72.04	81.07	480
Rutsiro	63.36	2.99	57.5	69.23	480
Rubavu	80.14	3.08	74.1	86.17	480
Nyabihu	70.45	2.4	65.74	75.15	480
Ngororero	90.24	1.38	87.53	92.95	480
Rusizi	85.1	2.4	80.38	89.81	480
Nyamasheke	85.86	1.88	82.17	89.55	480
Rulindo	82.59	1.94	78.79	86.39	480
Gakenke	86.17	2.27	81.72	90.62	480
Musanze	51.74	3.76	44.36	59.12	480
Burera	78.43	2.14	74.24	82.62	480
Gicumbi	76.01	3.89	68.39	83.64	480
Rwamagana	61.96	3.25	55.59	68.33	480
Nyagatare	92.78	1.21	90.41	95.15	480
Gatsibo	67.4	3.24	61.05	73.76	480
Kayonza	66.26	3.15	60.08	72.44	480
Kirehe	75.15	2.44	70.36	79.95	480
Ngoma	78.65	2.22	74.3	83.01	480
Bugesera	80.51	2.55	75.51	85.5	480

**Table B.2** % of HHs using firewood as primary source of cooking fuel

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	86.3	0.62	85.08	87.53	14,308
Kigali City	31.53	3.45	24.76	38.3	1,348
Southern Province	94.13	0.7	92.77	95.49	3,840
Western Province	92.18	1.2	89.82	94.53	3,360
Northern Province	90.94	1.76	87.5	94.39	2,400
Eastern Province	91.72	0.92	89.92	93.53	3,360
Kigali City Urban	20.28	2.95	14.49	26.08	1,177
Kigali City Rural	86.15	6.61	73.18	99.13	171
Southern Province Urban	82.62	3.44	75.86	89.37	492
Southern Province Rural	95.76	0.6	94.57	96.95	3,348
Western Province Urban	72.21	7.44	57.61	86.8	204
Western Province Rural	93.54	1.16	91.27	95.81	3,156
Northern Province Urban	69.3	11.61	46.52	92.08	132
Northern Province Rural	92.28	1.63	89.08	95.48	2,268
Eastern Province Urban	75.1	10.23	55.02	95.17	144
Eastern Province Rural	92.37	0.86	90.68	94.06	3,216

Urban	45.26	2.66	40.04	50.49	2,149
Rural	93.38	0.54	92.31	94.44	12,159
Q1	95.44	0.52	94.42	96.47	2,449
Q2	95.41	0.47	94.49	96.34	2,699
Q3	94.23	0.54	93.17	95.29	2,849
Q4	91.01	0.69	89.66	92.36	3,103
Q5	61.03	1.56	57.98	64.09	3,208
Nyarugenge	23.19	5.56	12.28	34.1	449
Gasabo	43.54	6.35	31.08	56	450
Kicukiro	20.69	4.63	11.61	29.77	449
Nyanza	96.26	1.44	93.44	99.09	480
Gisagara	99.34	0.37	98.62	100.07	480
Nyaruguru	99.78	0.22	99.35	100.21	480
Huye	93.34	2.81	87.82	98.86	480
Nyamagabe	96.83	1.2	94.48	99.17	480
Ruhango	76.39	3.44	69.65	83.13	480
Muhanga	95.76	1.58	92.66	98.86	480
Kamonyi	96.23	1.74	92.81	99.65	480
Karongi	97.89	1.25	95.44	100.34	480
Rutsiro	99.19	0.51	98.18	100.2	480
Rubavu	73.91	5.68	62.77	85.04	480
Nyabihu	88.72	3.97	80.93	96.52	480
Ngororero	98.84	0.45	97.95	99.73	480
Rusizi	91.02	3.08	84.98	97.06	480
Nyamasheke	97.17	2.23	92.79	101.55	480
Rulindo	85.99	1.46	83.13	88.86	480
Gakenke	99.36	0.36	98.65	100.07	480
Musanze	88.4	4.62	79.33	97.47	480
Burera	90.22	2	86.3	94.13	480
Gicumbi	90.43	5.04	80.55	100.31	480
Rwamagana	88.35	3.24	81.99	94.71	480
Nyagatare	75.38	3.98	67.58	83.19	480
Gatsibo	94.67	1.3	92.11	97.23	480
Kayonza	92.75	2.68	87.49	98	480
Kirehe	98.51	0.91	96.72	100.3	480
Ngoma	97.34	1.08	95.23	99.45	480
Bugesera	96.31	1.66	93.05	99.58	480

### Annex B 3 % of HHs using charcoal as primary source of cooking fuel

	Estimate	Standard error	Lower	Upper	Unweighted count
All Rwanda	10.64	0.59	9.48	11.8	14,308
Kigali City	64.98	3.31	58.49	71.47	1,348
Southern Province	2.42	0.5	1.44	3.41	3,840
Western Province	7.56	1.17	5.26	9.86	3,360
Northern Province	4.45	1.78	0.97	7.94	2,400
Eastern Province	4.24	0.81	2.66	5.82	3,360

Kigali City Urban	75.69	2.86	70.08	81.29	1,177
Kigali City Rural	12.99	6.38	0.48	25.5	171
Southern Province Urban	11.43	3.14	5.27	17.59	492
Southern Province Rural	1.15	0.31	0.54	1.75	3,348
Western Province Urban	27.28	7.21	13.12	41.43	204
Western Province Rural	6.21	1.13	4	8.43	3,156
Northern Province Urban	28.93	11.64	6.09	51.77	132
Northern Province Rural	2.94	1.66	-0.32	6.2	2,268
Eastern Province Urban	22.78	10.38	2.42	43.15	144
Eastern Province Rural	3.52	0.69	2.18	4.87	3,216
Urban	50.95	2.62	45.8	56.09	2,149
Rural	3.69	0.5	2.7	4.68	12,159
Q1	0.49	0.15	0.19	0.79	2,449
Q2	1.59	0.31	0.98	2.2	2,699
Q3	2.96	0.41	2.16	3.75	2,849
Q4	6.61	0.62	5.4	7.82	3,103
Q5	35.75	1.55	32.7	38.79	3,208
Nyarugenge	70.72	5.3	60.32	81.13	449
Gasabo	53.67	6.06	41.79	65.55	450
Kicukiro	77.18	4.58	68.2	86.17	449
Nyanza	2.81	1.34	0.19	5.43	480
Gisagara	0.22	0.22	-0.21	0.65	480
Nyaruguru	0	0	0	0	480
Huye	5.88	2.74	0.51	11.25	480
Nyamagabe	2.57	1.18	0.25	4.89	480
Ruhango	1.44	0.58	0.31	2.57	480
Muhanga	2.49	1.35	-0.15	5.13	480
Kamonyi	3.77	1.74	0.35	7.19	480
Karongi	2.04	1.24	-0.39	4.46	480
Rutsiro	0.6	0.48	-0.34	1.53	480
Rubavu	25.48	5.59	14.51	36.44	480
Nyabihu	10.53	3.66	3.34	17.71	480
Ngororero	1.16	0.45	0.27	2.05	480
Rusizi	8.75	3.09	2.69	14.81	480
Nyamasheke	2.83	2.23	-1.55	7.21	480
Rulindo	0.42	0.29	-0.16	1	480
Gakenke	0.64	0.36	-0.07	1.35	480
Musanze	11.14	4.57	2.19	20.1	480
Burera	1.28	0.67	-0.04	2.61	480
Gicumbi	6.09	5.27	-4.25	16.43	480
Rwamagana	10.33	3.3	3.85	16.8	480
Nyagatare	7.19	3.41	0.5	13.87	480
Gatsibo	1.39	0.7	0.02	2.77	480
Kayanza	6.74	2.41	2.01	11.48	480
Kirehe	1.49	0.91	-0.3	3.28	480
Ngoma	1.73	0.84	0.08	3.37	480
Bugesera	1.93	1.1	-0.22	4.08	480

Annex B 4 % of HHs using electricity distributors as primary source of lighting

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	10.83	0.68	9.49	12.16	14,308
Kigali City	55.64	3.09	49.58	61.71	1,348
Southern Province	3.31	0.67	1.99	4.64	3,840
Western Province	8.23	1.19	5.9	10.55	3,360
Northern Province	6.67	2.54	1.68	11.66	2,400
Eastern Province	5.64	0.94	3.79	7.49	3,360
Kigali City Urban	65.37	2.75	59.98	70.77	1,177
Kigali City Rural	8.41	5.15	-1.7	18.52	171
Southern Province Urban	16.84	4.19	8.63	25.06	492
Southern Province Rural	1.4	0.39	0.62	2.17	3,348
Western Province Urban	23.31	6.96	9.65	36.97	204
Western Province Rural	7.2	1.16	4.92	9.47	3,156
Northern Province Urban	28.51	11.12	6.69	50.33	132
Northern Province Rural	5.32	2.58	0.25	10.38	2,268
Eastern Province Urban	26.18	9.43	7.68	44.67	144
Eastern Province Rural	4.85	0.87	3.15	6.55	3,216
Urban	46.06	2.42	41.32	50.81	2,149
Rural	4.75	0.66	3.46	6.05	12,159
Q1	0.45	0.14	0.16	0.73	2,449
Q2	0.8	0.2	0.4	1.2	2,699
Q3	2.19	0.35	1.51	2.86	2,849
Q4	5.55	0.5	4.57	6.54	3,103
Q5	38.89	1.92	35.13	42.66	3,208
Nyarugenge	61.64	5.17	51.5	71.77	449
Gasabo	47.31	5.42	36.68	57.93	450
Kicukiro	62.98	4.88	53.41	72.56	449
Nyanza	2.87	1.77	-0.59	6.33	480
Gisagara	0.26	0.25	-0.24	0.76	480
Nyaruguru	0.68	0.38	-0.07	1.43	480
Huye	8.35	3.07	2.33	14.37	480
Nyamagabe	2.75	1.62	-0.43	5.93	480
Ruhango	2.65	1.41	-0.13	5.42	480
Muhanga	5.45	3.26	-0.95	11.85	480
Kamonyi	3.54	1.5	0.59	6.48	480
Karongi	2.82	1.41	0.05	5.59	480
Rutsiro	0.4	0.28	-0.15	0.94	480
Rubavu	20.98	5.32	10.54	31.42	480
Nyabihu	10.02	2.92	4.29	15.76	480
Ngororero	0.43	0.3	-0.16	1.03	480
Rusizi	13.55	3.66	6.36	20.74	480
Nyamasheke	7.66	3.11	1.56	13.76	480
Rulindo	2.63	1.07	0.53	4.73	480
Gakenke	1.03	0.84	-0.62	2.68	480
Musanze	14.46	4.59	5.46	23.46	480
Burera	3.22	1.56	0.16	6.28	480
Gicumbi	8.87	8.32	-7.45	25.19	480

Rwamagana	9.83	3.05	3.85	15.8	480
Nyagatare	11	4.04	3.07	18.93	480
Gatsibo	2.49	1.56	-0.58	5.56	480
Kayonza	7.51	2.23	3.15	11.88	480
Kirehe	1.62	0.81	0.03	3.22	480
Ngoma	3.4	1.36	0.74	6.06	480
Bugesera	4.29	2.3	-0.23	8.8	480

### Annex B 5 % of HHs exposed to LTR

	Estimate	Standard error	Lower	Upper	Unweighted count
All Rwanda	54.1	1.4	51.36	56.84	14,308
Kigali City	57.5	2.55	52.5	62.51	1,348
Southern Province	55.31	2.69	50.02	60.6	3,840
Western Province	43.3	2.8	37.8	48.79	3,360
Northern Province	55.43	4.04	47.5	63.37	2,400
Eastern Province	60.98	2.8	55.48	66.48	3,360
Kigali City Urban	50.99	2.52	46.05	55.94	1,177
Kigali City Rural	89.13	4.28	80.73	97.53	171
Southern Province Urban	65.86	6.18	53.72	77.99	492
Southern Province Rural	53.82	2.93	48.06	59.57	3,348
Western Province Urban	57.04	8.78	39.81	74.26	204
Western Province Rural	42.36	2.92	36.62	48.09	3,156
Northern Province Urban	68.03	9.94	48.52	87.53	132
Northern Province Rural	54.65	4.25	46.31	63	2,268
Eastern Province Urban	61.62	11.53	38.99	84.24	144
Eastern Province Rural	60.95	2.88	55.3	66.61	3,216
Urban	56.54	2.37	51.9	61.19	2,149
Rural	53.68	1.59	50.56	56.8	12,159
Q1	51.72	1.99	47.82	55.63	2,449
Q2	54.47	1.82	50.89	58.05	2,699
Q3	55.6	1.73	52.19	59	2,849
Q4	54.94	1.7	51.59	58.28	3,103
Q5	53.47	1.68	50.18	56.77	3,208
Nyarugenge	56.25	4.23	47.95	64.56	449
Gasabo	64.85	4.67	55.7	74	450
Kicukiro	47.25	3.68	40.03	54.46	449
Nyanza	66.98	6.61	54.01	79.95	480
Gisagara	54.67	7.84	39.28	70.06	480
Nyaruguru	46.74	7.74	31.56	61.92	480
Huye	65.5	7.38	51.01	79.99	480
Nyamagabe	60.01	7.57	45.16	74.86	480
Ruhango	47.29	7.86	31.88	62.71	480
Muhanga	52.33	7.78	37.07	67.59	480
Kamonyi	48.35	7.74	33.17	63.54	480
Karongi	33.44	8.06	17.62	49.26	480
Rutsiro	51.11	7.47	36.45	65.77	480
Rubavu	52.96	6.18	40.84	65.09	480

Nyabihu	41.01	6.93	27.41	54.61	480
Ngororero	41.74	7.57	26.88	56.6	480
Rusizi	40.17	6.95	26.54	53.8	480
Nyamasheke	42.59	7.64	27.61	57.58	480
Rulindo	51.78	7.83	36.41	67.15	480
Gakenke	46.78	7.66	31.75	61.8	480
Musanze	69.8	6.7	56.65	82.95	480
Burera	61.28	7.74	46.1	76.46	480
Gicumbi	48.54	10.56	27.82	69.26	480
Rwamagana	49.04	7.33	34.66	63.43	480
Nyagatare	48.2	7.13	34.22	62.18	480
Gatsibo	54.09	9.61	35.24	72.94	480
Kayonza	49.85	7.58	34.98	64.73	480
Kirehe	96.52	0.98	94.59	98.45	480
Ngoma	63.34	7.32	48.98	77.7	480
Bugesera	69.1	6.51	56.33	81.87	480

*Annex B 6 % of HHs that incurred expenditure on chemical fertilisers*

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	28.94	0.66	27.65	30.24	13,290
Kigali City	10.69	2.08	6.62	14.77	707
Southern Province	26.27	1.3	23.72	28.81	3,728
Western Province	37.3	1.53	34.29	40.3	3,236
Northern Province	39.03	1.9	35.3	42.76	2,358
Eastern Province	20.14	0.98	18.21	22.07	3,261
Kigali City Urban	7.28	1.52	4.3	10.26	548
Kigali City Rural	19.18	5.81	7.77	30.58	159
Southern Province Urban	21.98	3.93	14.28	29.69	449
Southern Province Rural	26.84	1.4	24.09	29.58	3,279
Western Province Urban	23.79	6.75	10.55	37.03	175
Western Province Rural	38.11	1.57	35.04	41.19	3,061
Northern Province Urban	22.91	3.69	15.68	30.15	121
Northern Province Rural	39.97	2.04	35.98	43.96	2,237
Eastern Province Urban	20.67	5.27	10.32	31.02	123
Eastern Province Rural	20.12	1	18.17	22.08	3,138
Urban	16.28	1.73	12.88	19.68	1,416
Rural	30.42	0.72	29.01	31.83	11,874
Q1	18.77	0.97	16.87	20.67	2,415
Q2	27.68	1.06	25.6	29.76	2,640
Q3	31.12	1.07	29.03	33.21	2,789
Q4	33.93	1.15	31.67	36.19	2,960
Q5	31.55	1.49	28.63	34.48	2,486
Nyarugenge	2.2	0.99	0.26	4.14	182
Gasabo	13.93	3.42	7.23	20.64	309
Kicukiro	10.36	3.17	4.14	16.58	216
Nyanza	9.12	2.18	4.85	13.39	458
Gisagara	27.16	3.44	20.41	33.9	477



Nyaruguru	42.14	4.69	32.95	51.34	475
Huye	31.24	3.95	23.5	38.99	453
Nyamagabe	36.71	4.53	27.82	45.61	473
Ruhango	13.27	2.36	8.64	17.89	464
Muhanga	30.27	3.74	22.93	37.61	474
Kamonyi	21.19	3.45	14.43	27.96	454
Karongi	38.92	3.4	32.25	45.58	470
Rutsiro	27.55	3.85	20	35.1	476
Rubavu	32.74	5.5	21.95	43.53	412
Nyabihu	61.63	5.24	51.35	71.91	466
Ngororero	28.6	3.2	22.32	34.88	478
Rusizi	31.56	3.68	24.33	38.78	462
Nyamasheke	41.55	2.91	35.84	47.25	472
Rulindo	37.29	3.97	29.49	45.08	473
Gakenke	62.87	4.01	55.02	70.73	475
Musanze	46.47	4.83	37	55.94	464
Burera	41.57	4.01	33.71	49.43	473
Gicumbi	16.54	2.88	10.9	22.19	473
Rwamagana	30.54	3.92	22.84	38.24	460
Nyagatare	10.5	2.05	6.47	14.52	460
Gatsibo	10.51	2.3	6.01	15.02	475
Kayonza	12.79	2.6	7.69	17.9	455
Kirehe	52.37	3.91	44.71	60.04	471
Ngoma	22.56	2.78	17.11	28.01	471
Bugesera	8.81	1.83	5.23	12.39	469

## Annex C Confidence intervals for selected indicators, EICV2

### Annex C 1 % of HHs living in *Imidugudu*

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	17.64	0.80	16.08	19.20	6,900
Kigali City	6.57	1.49	3.64	9.50	1,026
Southern Province	3.93	0.70	2.55	5.31	1,707
Western Province	5.46	1.00	3.50	7.42	1,653
Northern Province	13.65	2.18	9.37	17.93	1,059
Eastern Province	54.79	2.46	49.97	59.61	1,455
Kigali City Urban	6.23	1.66	2.98	9.49	954
Kigali City Rural	8.45	3.26	2.04	14.86	72
Southern Province Urban	2.79	1.50	-0.17	5.74	279
Southern Province Rural	4.13	0.77	2.61	5.65	1,428
Western Province Urban	14.44	5.88	2.89	25.99	153
Western Province Rural	4.73	0.96	2.85	6.61	1,500
Northern Province Urban	12.07	6.20	-0.11	24.25	135
Northern Province Rural	13.82	2.35	9.21	18.43	924
Eastern Province Urban	73.61	11.36	51.30	95.93	99
Eastern Province Rural	53.75	2.62	48.60	58.90	1,356
Urban	11.73	2.14	7.53	15.94	1,620
Rural	18.80	0.98	16.87	20.74	5,280
Q1	13.18	1.33	10.57	15.79	1,119
Q2	16.15	1.46	13.29	19.01	1,226
Q3	18.41	1.22	16.02	20.81	1,268
Q4	19.90	1.38	17.18	22.62	1,397
Q5	19.47	1.29	16.93	22.00	1,890

### Annex C 2 % of HHs whose main water source is improved

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	70.27	1.22	67.87	72.66	6,900
Kigali City	84.77	2.84	79.18	90.35	1,026
Southern Province	73.42	2.02	69.46	77.38	1,707
Western Province	67.80	2.25	63.37	72.22	1,653
Northern Province	76.74	2.87	71.10	82.39	1,059
Eastern Province	57.71	3.36	51.12	64.30	1,455
Kigali City Urban	86.74	2.58	81.67	91.82	954
Kigali City Rural	73.79	11.40	51.40	96.17	72
Southern Province Urban	83.50	4.41	74.83	92.17	279
Southern Province Rural	71.72	2.17	67.45	75.99	1,428
Western Province Urban	71.77	6.81	58.38	85.15	153
Western Province Rural	67.48	2.43	62.70	72.26	1,500
Northern Province Urban	81.58	7.20	67.44	95.73	135
Northern Province Rural	76.23	3.07	70.20	82.25	924
Eastern Province Urban	87.29	7.24	73.07	101.51	99

Eastern Province Rural	56.07	3.47	49.26	62.88	1,356
Urban	83.87	2.01	79.91	87.82	1,620
Rural	67.59	1.40	64.85	70.33	5,280
Q1	66.56	2.04	62.56	70.56	1,119
Q2	66.67	1.85	63.03	70.31	1,226
Q3	67.24	1.73	63.84	70.63	1,268
Q4	68.92	1.87	65.25	72.59	1,397
Q5	79.59	1.35	76.95	82.23	1,890

### Annex C 3 % of HHs with improved sanitation

	Estimate	Standard error	Lower	Upper	Unweighted count
All Rwanda	58.52	0.86	56.83	60.21	6,900
Kigali City	78.54	3.31	72.05	85.04	1,026
Southern Province	56.16	1.60	53.03	59.30	1,707
Western Province	57.86	1.58	54.75	60.96	1,653
Northern Province	64.63	2.08	60.55	68.71	1,059
Eastern Province	48.55	2.03	44.56	52.53	1,455
Kigali City Urban	83.95	2.42	79.20	88.70	954
Kigali City Rural	48.51	11.01	26.89	70.13	72
Southern Province Urban	66.50	3.93	58.79	74.22	279
Southern Province Rural	54.42	1.72	51.03	57.81	1,428
Western Province Urban	69.50	7.17	55.41	83.59	153
Western Province Rural	56.91	1.59	53.79	60.03	1,500
Northern Province Urban	70.00	8.28	53.74	86.27	135
Northern Province Rural	64.06	2.09	59.96	68.16	924
Eastern Province Urban	55.92	7.74	40.71	71.13	99
Eastern Province Rural	48.14	2.10	44.01	52.27	1,356
Urban	74.87	2.00	70.94	78.80	1,620
Rural	55.30	0.94	53.46	57.14	5,280
Q1	42.41	1.66	39.15	45.68	1,119
Q2	51.09	1.72	47.71	54.47	1,226
Q3	55.59	1.54	52.56	58.62	1,268
Q4	60.95	1.64	57.73	64.17	1,397
Q5	76.62	1.27	74.12	79.12	1,890

### Annex C 4 % of HHs using firewood as primary source of cooking fuel

	Estimate	Standard error	Lower	Upper	Unweighted count
All Rwanda	88.20	0.68	86.87	89.52	6,900
Kigali City	38.92	4.78	29.54	48.30	1,026
Southern Province	96.52	1.09	94.39	98.66	1,707
Western Province	94.57	1.07	92.47	96.68	1,653
Northern Province	86.11	1.71	82.75	89.47	1,059
Eastern Province	94.00	1.38	91.30	96.70	1,455
Kigali City Urban	27.92	3.65	20.74	35.10	954
Kigali City Rural	100.00	0.00	100.00	100.00	72

Southern Province Urban	78.13	5.97	66.41	89.86	279
Southern Province Rural	99.62	0.23	99.16	100.08	1,428
Western Province Urban	64.62	8.40	48.13	81.11	153
Western Province Rural	97.00	0.74	95.54	98.46	1,500
Northern Province Urban	71.42	7.70	56.31	86.54	135
Northern Province Rural	87.67	1.63	84.48	90.87	924
Eastern Province Urban	72.81	11.90	49.45	96.18	99
Eastern Province Rural	95.17	1.24	92.74	97.61	1,356
Urban	51.35	2.91	45.63	57.07	1,620
Rural	95.45	0.50	94.47	96.43	5,280
Q1	93.56	0.90	91.80	95.33	1,119
Q2	94.12	0.70	92.76	95.49	1,226
Q3	96.12	0.60	94.93	97.30	1,268
Q4	92.66	0.83	91.03	94.29	1,397
Q5	68.94	1.75	65.50	72.38	1,890

### Annex C 5 % of HHs using charcoal as primary source of cooking fuel

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	7.93	0.55	6.84	9.02	6,900
Kigali City	57.09	4.54	48.18	66.00	1,026
Southern Province	2.39	0.97	0.48	4.31	1,707
Western Province	3.73	0.98	1.80	5.65	1,653
Northern Province	2.61	1.02	0.61	4.60	1,059
Eastern Province	2.68	0.99	0.73	4.63	1,455
Kigali City Urban	67.37	3.60	60.31	74.43	954
Kigali City Rural	0.00	0.00	0.00	0.00	72
Southern Province Urban	15.58	5.73	4.32	26.83	279
Southern Province Rural	0.17	0.10	-0.02	0.36	1,428
Western Province Urban	29.62	8.14	13.64	45.61	153
Western Province Rural	1.63	0.67	0.33	2.94	1,500
Northern Province Urban	23.25	8.03	7.49	39.02	135
Northern Province Rural	0.41	0.24	-0.05	0.88	924
Eastern Province Urban	12.48	5.98	0.75	24.22	99
Eastern Province Rural	2.14	0.99	0.20	4.08	1,356
Urban	42.68	2.77	37.23	48.13	1,620
Rural	1.09	0.31	0.49	1.70	5,280
Q1	0.34	0.14	0.06	0.63	1,119
Q2	0.95	0.23	0.50	1.39	1,226
Q3	0.93	0.25	0.43	1.42	1,268
Q4	4.91	0.68	3.58	6.24	1,397
Q5	27.63	1.66	24.36	30.90	1,890

*Annex C 6 % of HHs using electricity distributors as primary source of lighting*

	<b>Estimate</b>	<b>Standard error</b>	<b>Lower</b>	<b>Upper</b>	<b>Unweighted count</b>
All Rwanda	4.34	0.35	3.66	5.02	6,900
Kigali City	29.67	2.85	24.06	35.28	1,026
Southern Province	2.08	0.65	0.80	3.36	1,707
Western Province	1.95	0.57	0.83	3.08	1,653
Northern Province	0.99	0.44	0.14	1.85	1,059
Eastern Province	1.66	0.62	0.44	2.88	1,455
Kigali City Urban	35.01	2.68	29.75	40.27	954
Kigali City Rural	0.00	0.00	0.00	0.00	72
Southern Province Urban	11.89	3.57	4.87	18.90	279
Southern Province Rural	0.43	0.26	-0.08	0.93	1,428
Western Province Urban	12.85	4.70	3.62	22.07	153
Western Province Rural	1.07	0.45	0.18	1.96	1,500
Northern Province Urban	9.13	3.91	1.45	16.80	135
Northern Province Rural	0.13	0.13	-0.12	0.37	924
Eastern Province Urban	14.85	7.11	0.88	28.82	99
Eastern Province Rural	0.92	0.50	-0.07	1.92	1,356
Urban	23.06	1.82	19.48	26.64	1,620
Rural	0.66	0.19	0.28	1.03	5,280
Q1	0.00	0.00	0.00	0.00	1,119
Q2	0.16	0.10	-0.03	0.35	1,226
Q3	0.13	0.09	-0.05	0.30	1,268
Q4	0.55	0.19	0.18	0.92	1,397
Q5	17.77	1.27	15.27	20.27	1,890

## NOTES



