

# IMPACT EVALUATION OF INYENYERI RWANDA

## Household Energy and Human Well-being (R4-2016)

We hypothesize three pathways through which household energy interventions can improve human well-being.

**Relaxing labor constraints:** Interventions that reduce fuel collection and cooking time increase the overall time available for other activities in the household, particularly for women. This, in turn, can lead to a reallocation of time among household members, which can impact household livelihood strategies. The adoption of cleaner cooking energy systems may enable women to diversify their sources of income, for example, by participating in wage employment or entrepreneurial activity, both of which require a greater amount of time spent away from the home.

**Relaxing financial constraints:** Money spent on fuels burned using inefficient combustion processes and stoves that are not durable can occupy a relatively large share of household budgets. Cleaner cooking energy systems can reduce the financial burden on households by more efficiently burning fuels. More durable improved stoves reduce the need to replace cookstoves which are frequently made of weak materials.

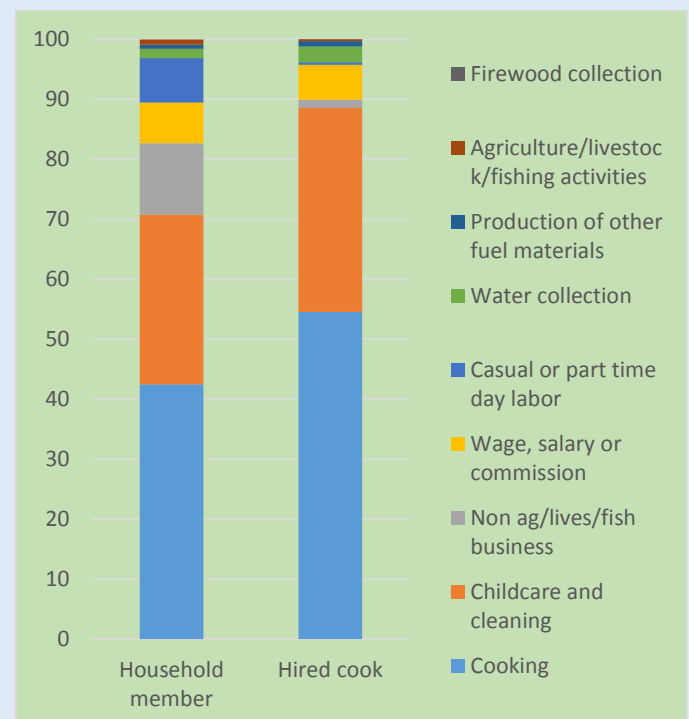
**Improved health and associated productivity and reduced health care costs:** Improved health itself can increase time endowments by reducing days lost to illness or days spent caring for those who are sick. Better health can also directly impact labor productivity, especially in developing countries where manual labor is important. Improved health also benefits households by reducing the out-of-pocket expenditures on curative health care.

### Research Question

*Does adoption and sustained use of the Inyenyeri household energy system affect time use and household well-being?*

### Labor allocation of primary cook

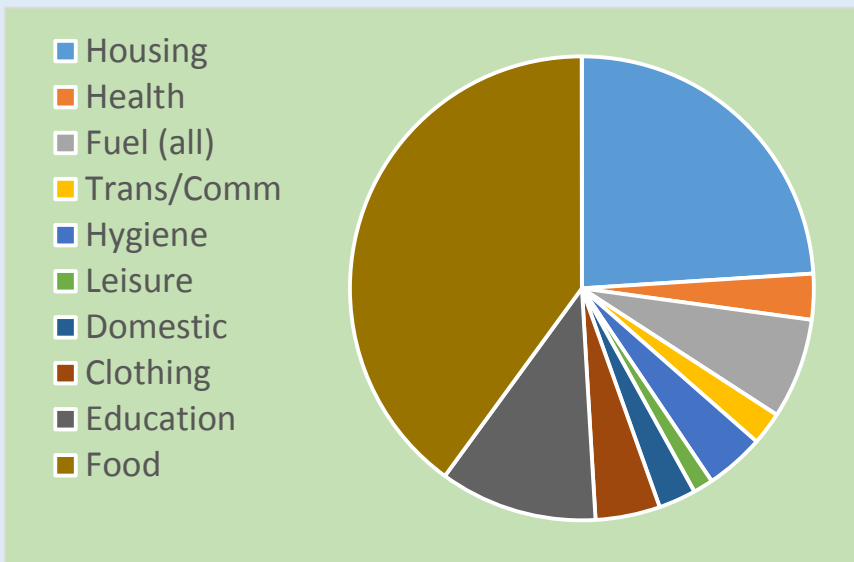
At baseline we collected data on how primary cooks in the household spent their productive time during the past 7 days. Cooks that are hired into the household worked an average of 50 hours, whereas cooks that are members of the household worked an average of 45 hours. There are considerable differences in time allocation between cooks that are hired into the household, and cooks that are household members (Fig 1) with respect to cooking, non-agriculture/livestock/fishing related business and production of other fuel materials.



Given the number of male cooks in our sample (22%) we analyzed time use data by gender of primary cook. We do find that in the past 7 days, male cooks spent more time cooking (23.1 hours) and in wage employment (4.5 hours), compared to female cooks (21.3 and 2.5 hours, respectively). Female cooks spent more time in non-agricultural household businesses (4.3 hours) compared to male cooks (1.7 hours).

### Household expenditures on fuel

Our survey data reveal that households in Gisenyi do not generally collect fuelwood.



They do spend a small amount of time collecting elephant grass (0.3 hours per week). Most fuel is purchased in the local market daily or every few days.

Median consumption for households in our sample is RWF 58,000 or roughly US\$2.75 per person per day. Median cooking fuel consumption is RWF 11,000/month, or 5% of the budget share. Budget shares reflecting the distribution of expenditures within the household are indicated in Figure 2.

**Figure 2: Budget shares for monthly expenditures**

The light gray segment of the pie (7%) represents the share of the budget allocated to cooking and lighting fuels.

**Productivity and health care costs**

Approximately 25% of all individuals in our sample experienced a significant health problem in the four weeks prior to the baseline study. We collected data to assess how frequently normal daily activities were disrupted due to illness. Forty-eight percent of those who indicated they had a significant health problem were unable to carry out their normal duties due to illness/injury. Many health problems experienced by household members are associated with household air pollution exposure including:

- Acute respiratory infection (34.2%)
- Other respiratory illness (7.1%)
- Eye problems (3.8%)

On average individuals were unable to carry out their normal activities for 5.8 days. Health burden has implications for household expenditures. Most individuals sought advice from a doctor, health worker or pharmacist about how to deal with their illness or injury. The average expenditure on consultations was RWF 8,000.



**Figure 3: Men cook too**

**Next steps:** Our next round (Wave 2) of data collection will take place May-July 2016. Our data collection will include information on time use for household members and cooks, expenditures on fuel, and health related productivity and expenditures to evaluate whether adoption of the Inyenyeri cleaner energy cooking system results in improvements in well-being.



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