

Drudgery Reduction for Women in Rural India

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ABSTRACT: In rural India, women play a vital role in agriculture and in other agro-based activities. The work for rural women in India is very demanding and labour extensive. It is estimated that women on an average work for about 8-9 hours/day in agricultural operations like weeding, transplanting, harvesting, threshing and storage etc. and an average of 4 hours in household activities. Majority of farm women spent an average time of 2-4 hours/day in agriculture and less than two hours in livestock and poultry. This time mentioned is for women involved in farming only if a family is involved in cattle rearing then the household work takes 7-8 hours because the additional work for cattle is added to women more than men because they need to make huge amount of food for cattle and take care of them like their thirst, cleaning, prenatal and post-natal care of the cattle and the newborn. Women play a pivotal role in household, farm and allied activities. The survey conducted by us on 10 families of rural Bihar came up with the result that women face the most drudgery in cooking due to traditional ways of cooking on chulhas by using old traditional methods like firewood, coal, cow dung cake etc. which is hazardous to their health and also bad for environment and is responsible for increasing mortality rates among newborn babies. Because of many women's do not have water supply to their homes they need to carry heavy amount of water from longer distances for daily requirements of water and to get the firewood for cooking they need to collect and store crop waste, need to make cow dung cake for cooking and store and protect it from seasonal disruptions. We need to address the common issues of women to empower them to achieve more out of them. Technology can be a boon for addressing these issues we will lead nearer to our sustainable development goals.

KEYWORD: Induction, solar cell, automatic switch, control panel, sustainable development goals, etc.

I. INTRODUCTION

Cooking is the most important part of any women life in India it is been thought that cooking and household work needs to be done by women only. In some areas of our country people even think that women are just for cooking food, doing household work, taking care of family members and they need to be confined into kitchen only they shall not have any kind of exposure to different kind of activity which is required for better development of individual. Women's work in the agricultural sector has been largely confined to farming and certain specific operations like transplanting, weeding, sowing and storage. These are manual activities that entail longer hours of work and require postures that adversely affect women's reproductive health. In addition to these activities in the public sphere, women are also responsible for relentless chores inside the home. Taking care of the domestic livestock, bringing up their children, catering to the needs of the men in the home and other household work, adds to the seemingly endless list of tasks being done by women. It has also been noted that a lot of the work done by women both within the home and on the farm, is unpaid or grossly underpaid and mostly unrecognized.

According to the Food and Agricultural Organization, women farmers account for more than a quarter of the world's population. Yet, in India, only 12.8% of the total agricultural holders are women and 0% women are land owners even though around 43% percent of the agricultural work force in developing countries consists of women agriculturists. Drudgery can be defined as physical and mental strain, agony, monotony and hardship experienced by human beings. Women tend to bear the brunt of drudgery since they continue to be most affected by illiteracy, malnutrition and unemployment. Women usually perform their economic tasks with traditional tools, which were designed mainly for men keeping in

mind their physical features (height, weight bearing etc.). Women friendly and gender appropriate tools are either unavailable or insufficient in number or unused due to lack of awareness. Such tools, coupled with often hazardous, unhealthy work conditions and long work hours create and accelerate many health problems for women farmers. Women having to invest a lot in both agricultural and household work with dismal returns is supposed to be a source of extreme drudgery on them. The migration of men has also led to a massive increase in the number of households headed by women in the villages. These now, on an average, form around 20-25

percent of all rural households in developing countries. The rural woman's drudgery has, thus, increased manifold as they are now the primary providers of the households as well, shouldering both their own and their husbands.

II. METHODOLOGY

In this we have tried to develop a device for cooking large amount of food for cattle's and boiling water and making food for household. this will help in reducing drudgery for women in rural India which comes with long hours of work and sitting in kitchen .

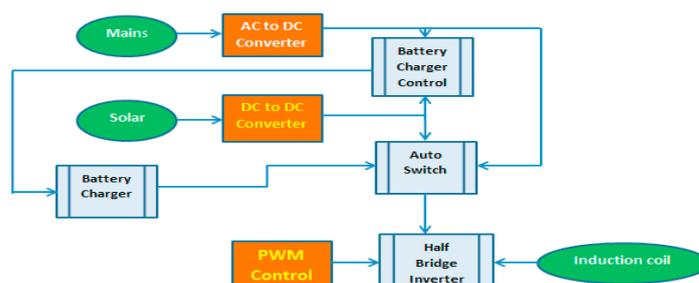


Figure 1. block diagram

Induction cooktop

Induction heating is a completely different method to generate heat as compared with conventional electric heaters. In an induction heater, the cooking vessel itself is a part of heat generating device, or the cooking vessel itself generate heats. In an induction cooker, initially an AC supply of 50 Hz is applied. It is then rectified to DC and subsequently back to a high frequency AC through

an inverter. This high frequency current produces a high frequency alternating magnetic field through an induction coil. Therefore, placing a cooking pan / utensil close to the induction coil will induce eddy current in the pan. As a result of which, heat energy will be produced on the surface of the pan. The internal resistance of the pan causes heat to be dissipated according to Joule's effect. Thus, it is the pan itself and not the heater that heats up and cooks the food.

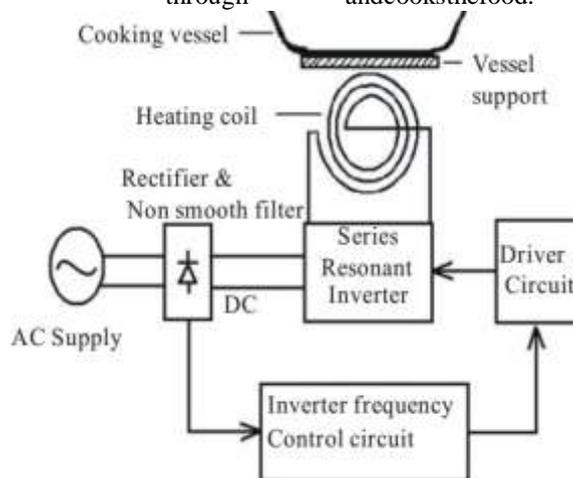


Figure 2. induction functioning

Basic Requirement of an Induction Cooker

- (i). Switching in the radio-frequency range
- (ii). Power factor close to unity
- (iii). Wide power range

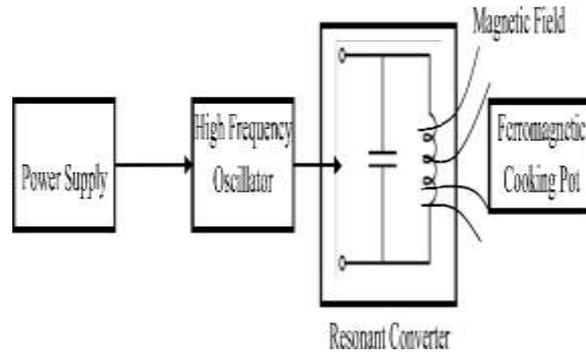


Figure 3. solar induction circuit

SOLAR CELL

Solar photovoltaic cells, or PV cells are made using **silicon crystalline wafers** which are similar to the wafers used to make computer processors. The silicon wafers can be either polycrystalline or monocrystalline and are produced using several different manufacturing

methods. The most efficient type is monocrystalline (mono) which are manufactured using the well-known Kochanski process. This process is more energy intensive compared to polycrystalline (poly) and therefore more expensive to produce.

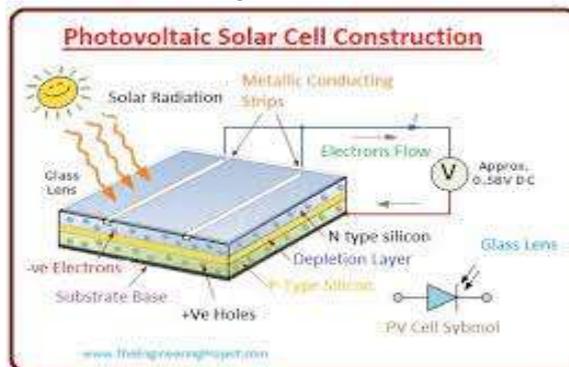


Figure 4. solar cell diagram

Polycrystalline wafers on the other hand, are slightly less efficient and are made using several purification processes followed by a simpler, lower cost, casting method. More recently, cast monocrystalline or cast mono cells have been gaining in popularity. The reason is due to the lower-cost casting process used to make cast mono cells which is similar to the process used for polycrystalline silicon cells. However, cast-mono wafers are not quite as efficient and pure mono wafers made using the Kochanski process.

INPUT AUTOMATIC SWITCH

The auto select switch makes the auto selection of any available supply between solar and

the grid and select whichever is sufficient by doing power demand analysis. The solar power is priority in the analysis for cheap selection and usage. In simulation, the auto switch is controlled by microcontroller program. The battery power level is compared to the switching state selected. If the battery level is sufficient the coil is powered from the battery. In this design, the auto switch is programmed such that the source selection is done at the beginning of each cooking state. If the battery is not sufficient to supply the required power for the cooking state selected and for the duration calculated, the mains power will be selected and the battery will be charged either from solar or from mains.

INTERFACING PANEL

Each induction has its own control panel with a unique set of functions. There are primarily three types of switch controls in the control panel of the Induction. A rotating knob control, a press button control or a touch sensor control. Switch on the induction by pressing the on/off button according to the instructions in the guide menu. The control panel has the following buttons to help

you with cooking. Power buttons, temperature buttons, timer button, + and – buttons to increase and decrease the power/temperature/time. An LED display panel for you to read the values and monitor your cooking temperatures, powers, timings, etc. for the feel of flame, some high-end inductions feature LED flames to give a visual idea to the user about the heat.



Figure3. user control panel

The device has dual power supply that is one mains ac supply and the other is solar ac /dc supply

Mains

The mains power gives alternating current from the grid. The grid voltage is converted to direct current supply via AC to DC converter. 230V 30A mains socket is used in both simulation and practical as it is a standard voltage.

AC to DC Converter

A simple AC to DC converter is used to convert the Mains input to DC for further conversion using boost converter to charge the battery. The simulation of the AC to DC converter is shown in fig. 2.

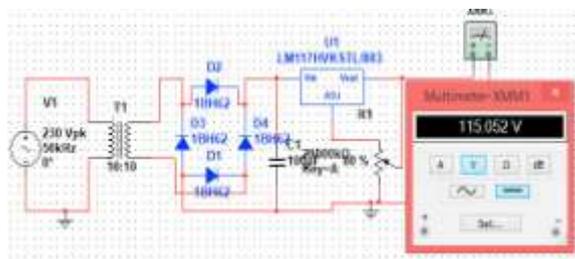


Figure 4: AC to DC converter

This converter makes it convenient for the batteries and the half bridge converter to work perfectly since the implementation needs only DC supply. A 230V mains AC voltage that is converted to 115V DC at 1200W power level. The other most important factor is to make it flexible in the range of frequencies for different power levels in the inverter section.

Solar

The solar is the primary source of supply for the cooker. Solar is made up of photovoltaic cells that converter solar energy into electrical energy in the form of direct current. PV modules generate electricity from sun. Due to the non-linear characteristics of PV system, the output power is

not constant all the times throughout the day. In this design, batteries, DC-to-DC converter work together with PV systems to regulate the voltage of the PV systems. In this research, solar is the main source power for heating the induction coil and a 300W solar panel is used. This unit depends on the sun radiation to supply energy.

ADVANTAGES OF SOLAR COOKTOP

- Ability to function unattended for long periods as evidence
- Modular nature in which desired currents, voltages and power levels can be achieved by more integration
- Maintenance cost is low as they are easy to operate
- They do not create pollution
- They have a long effective life, and
- They are highly reliable

DISADVANTAGES OF SOLAR COOKTOP

- Distributed nature of solar energy
- Absence of energy storage. While the first disadvantage can be partly overcome by concentration, the second is an inherent disadvantage overcome in PV systems by the use of conventional storage batteries. Efforts are being made worldwide to reduce costs per watt through various technological innovations.

III. CONCLUSION

Our device is aiming towards reducing drudgery for women in rural India because many a time we don't even realize what a women need stop go through on daily basis in normal days its even sustainable but when they are on their menstrual cycle, they are not given any kind of concession despite of their illness they need to do their regular works like usual days. we don't address the services given by women on day-to-day basis as work because these doesn't contribute in economy of the country.

Feminization of agriculture in India is evident from the out-migration of male for better job opportunities to abroad or city areas. It has increased burden for women to sustain the agriculture sector inputs the household chores. Many scholars have shown that women's work load has been increasing as compared to men counterpart in agriculture sector. The findings from desk review of existing research studies reveals that the multidimensional factors to contribute for women's drudgery reduction in the agriculture sub-sectors in India. The desk reviews show that

various characteristics and variables act together to influence the drudgery reduction for women in agriculture such as: i) socio- demographic (location, age, marital status, family type, education, occupation and outmigration); ii) economic (access to road, energy, infrastructure, technologies, land ownership, other property right, access to ICT, agribusiness development through value chain approach); iii) institutional (capacity development, awareness, memberships, access to financial and service); and iv) other framework variables (like access to extension service, work load and income distribution and sharing).

Considering above aspects, the workload of women (time and energy) spent on on-farm activities can be reduced in two ways:

- Making existing tasks easier or increasing the productivity of existing labour, and
- Changing farm practices and/or introducing new technologies and practices.

It is further suggested that the India Agricultural Research Council (IARC) need to have women farmers' represented in its governing body to set agenda for women-friendly agricultural technology. Similarly, India needs to have a national extension strategy (NES). The agricultural technology (research and extension) should be client based, collaborative, pluralistic, market-oriented as well public-service oriented. The agricultural technology and other support institutions are overdue for redesigning also from the point of federal governance, which has three-tiers, namely, the Central, Provincial and (rural) Municipal levels.

IV. FUTURE SCOPE

It will be beneficial for drudgery reduction as it will be helpful in reducing time for cooking and as or country is ranked on the basis of SDGs it will be helpful in attaining the SDG of clean and affordable fuel and health & well being so it is very essential that we should use renewable energy sources for cooking.

Cooking solutions are becoming convenient quick and efficient, but ensuring the availability of the same as clean, reliable and affordable remains a humongous task for world leaders and policy makers. The thrust on clean energy scenario is at its peak at present and the need of the hour. The emergence of solar PV cooking can be most viable solution to address cooking needs as it fits well in 5C parameters of convenience, control, cost-effective, clean and compact. Since the solar PV cooking solutions fits well to full fill the cooking needs, both urban as well as in rural areas. If promoted well, it can grow

significantly and it will not be far when it becomes one of the most adopted cooking ways.

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