DEVELOPMENT AND FABRICATION OF SEED STORAGE SYSTEM FOR COMMUNITY LEVEL SEED BANK AND MARGINAL FARMERS

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Introduction:
Community seed banks are collections of seeds of local landraces that are maintained and administered by the communities themselves. Seeds can be stored by a community either in large quantity to ensure that planting material is available, or in small samples to ensure that genetic material is available even if varieties become endangered or extinct. The main aim of community seed bank is to increase local seed security and contributing to the possibilities to continued utilization of locally important genetic diversity. In the conventional method of storage of the seeds facing many problems such as controlling surrounding temperature and humidity level protecting the seeds from pests, insects and rodents. Use of modern refrigerating devices is not affordable for marginal agriculturists and also uninterrupted power supply in rural areas is the major hurdle. This pose the need of a simple, eco-friendly and economically viable seeds storage device that can help marginal agriculturists to preserve the seeds. A device comprises of typical peltier plate with semiconductor thermoelectric module with P and N bismuth telluride semiconductor material connected in series may fulfill the above need. This device operates on solar power as well as conventional AC power supply thereby working of this device is more reliable.

Objectives:
1. To develop seed storage system for marginal scale farmers.
2. To focus on seed quality and principle of seed storage systems.
3. To preserve the seeds for future germination and seed growth.
4. To protect the seeds from pests, insects and rodents.
5. To preserve the seeds by controlling it’s surrounding temperature and humidity level.
6. Create an effective storage unit for long term storage.

Methodology:
After harvesting of crops the seeds from the marginal farmers are collected which are going to be used for growing crops for next season. These seeds are dusted, cleaned and dried which will be then ready for storage. These seeds are then packed in air tight container and then will be placed in a seed storage system. The temperature of the system should be maintained with the help of thermoelectric cooling principle. The storage system should be
frequently maintained and checked for variation in the humidity of the atmosphere. The seeds are then retrieved from the system whenever their requirement arises by the marginal farmers.

![Figure 1. Construction of Storage System.](image)

### Materials Used:

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<th>MATERIALS</th>
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| Peltier Module          | It is a thermoelectric module which produces a temperature difference by exchanging heat between two electrical junctions (P & N). | • Voltage: 12V  
                          |                                                             | • Vmax: 15.4V  
                          |                                                             | • Imax: 5Amp   |
| 12v Dc Cooling Fans     | Dc fans blow air along the axis of the fan.                                 | • Max air flow: 49.7 CFM  
                          |                                                             | • Rated speed: 4500 rpm  
                          |                                                             | • Rated voltage: 12V |
| Battery                 |                                                                             | • Voltage: 12V  
                          |                                                             | • Current: 7.2Amp       |
| Temperature controller  | Is an instrument used to control the temperature. The temperature controller takes an input from an temperature sensor and as an output that is connected to a controller unit. | • Input power- 12v  
                          |                                                             | • Control range- -50 to 110C  
                          |                                                             | • Accuracy- 0.1C |

### Fabrication Procedure:

A thermocol box of inner cabin volume of 2 foot is slotted on 1 faces with the reference of the measurement of CPU heat sinks. The inner surface of the cabin is insulated completely using thermocol sheets so as to isolate the cooling cabin from the atmosphere. The thermo electric module is sandwiched between two CPU heat sinks of different sizes using thermo paste to set a single unit (it will look exactly like peltier cooling kit which we shown in above). Thermo paste plays a vital role in conduction of heat from Peltier module to the aluminum heat sinks. And at the end it is attached to the left side of the storage system where pocket is made. These units are placed in the cut slots with the smaller CPU heat sinks facing the interior of the cooling cabin and the larger CPU heat sinks on the outside of the
cabin to establish greater heat rejection. Addition fans are fitted on the outer side of the heat sinks. Electrical connections are made and power is supplied from a AC 12V 7.2A adapter is connected to the electric plug.

**Conclusion :**
- The stored seeds can be used by farmers for agriculture purpose for grooving crops.
- This system helps to the marginal farmers in saving the cost of buying new seeds from market.
- The seeds in the storage system can also be sold which can earn some profits.
- The quality of the seeds can be maintained for longer duration.

**Scope for Future Work :**
- This system can be further improved by installing thermo sensor which can be programmed using arduino board, to vary the power supply within specified range of temperature.
- This device can be used to store different types of seeds by storing in different compartments and temperature of each compartment may be controlled by independent thermo sensor.