Unnat Bharat Abhiyan-2.0 Program
A Flagship Program of Ministry of Education, Government of India

Funded by
National Coordinating Institute
Indian Institute of Technology, Delhi

A Project Report of

Advanced Community Solar Dryer for Agro Products

Category: Technology Development
Project No.: RP-03525G

Submitted by:

Dr.S.N.Topannavar
Principal Investigator: SEG Project & UBA Program Coordinator
Dean (Academics) and Professor & Head
Mechanical Engineering Department

S.J.P.N Trust's
Hirasugar Institute of Technology,
Nidasoshi-591 236, KARNATAKA
Approved by AICTE, New Delhi, Permanently Affiliated to VTU, Belagavi
Recognized under 2(f) &12B of UGC Act, 1956
Accredited at 'A' Grade by NAAC
Programmes Accredited by NBA:CSE,ECE,EEE & ME

ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of any task would be incomplete without mention of the people who made it possible, whose constant guidance and encouragements crowned my efforts with success. We take this opportunity to express my deepest gratitude and appreciation to all those who helped us directly or indirectly towards the successful completion of this project.

Our special thanks to Unnat Bharat Abhiyana Program, Ministry of Education, Govt. of India for giving an opportunity serve the society through SEG-Technology Development Project. We are grateful to the National Coordinating Institute, UBA-2.0 SEG of Indian Institute of Technology, Delhi for giving us to serve the adopted villages by selecting and funding the project.

We consider this as a privilege to express my heartfelt gratitude and respect to all people and functionaries of 5 adopted villages (Nidasoshi, Ammanagi, Kesti, Borgal and Hattarwat) specially Chairman, PDOs, Members, all farmers for their cooperation to conduct surveys and to implement the UBA project.

My special thanks to our principal Dr.S.C.Kamate, staff and student volunteers and project associates of Hirasugar Institute of Technology Nidasoshi for providing facilities and their valuable participation to complete this project successfully.

18/12/05.

Dr.S.N.Topannavar
Principal Investigator: SEG Project &
UBA Program Coordinator

Hirasugar Institute of Technology NIDASOSHI. PIN-591236. Dist:Belgaum.

INDEX

Hirasugar Institute of Technology NIDASOSHI. Dist:Belgaum.

Sanctioned and Approvals Letters

उन्नत भारत अभियान
ग्रामीण विकास एवं प्रौद्योगिकी केंद्र
भारतीय प्रौद्योगिकी संस्थान, दिल्ली
हौजखास, नयी दिल्ली– 110016

UNNAT BHARAT ABHIYAN
INDIAN INSTITUTE OF TECHNOLOGY, DELHI
National Coordinating Institution
Address: V-405, IIT Delhi Main Rd, Block 5, Hauz Khas, New Delhi, 110016
Tel: +91-11-2659 1121/1157, Fax: +91-11-2659 1121
Email: unnatbharatabhiyaniitd@gmail.com

Date: January 30, 2023

To

Dr. S.N. Topannavar

Hirasugar Institute of Technology, Belagavi, Karnataka

Subject: Financial Sanction of Technical Intervention project (No. RP-03525G) under UBA 2.0

Dear Sir

1. This is to intimate you that Technology Intervention proposals under the category of "**Technology Development**": Project-No: **RP-03525G** entitled, **"Advanced Community Solar Dryer for Agro Products**" submitted by you under the ***Unnat Bharat Abhiyan 2.0 Program***, has been approved by **Sustainable Agriculture System** SEG and funded by the **National Coordinating Institute UBA 2.0 (IIT Delhi)** against **UTR No. – 269545171** vide dated **30-12-2022.**

2. You can use the grant for fulfilling the project objectives under the approved heads as per the proposal, using the established procedure of your institute and as per the UBA guidelines, within 6 months from the date of receiving of funds. Kindly note that the utilization of funds allowed under the head "General Contingency" should not be more than 10% of the total sanctioned fund.

   Note: *TA/ Honorarium is strictly not permitted in this project.*

3. Any product/service developed under the sanctioned project must have UBA logo on it.

4. Detailed information of faculty in-charge and students/volunteers, who will be coordinating/ working under the sanctioned project, shall be shared in the project report submitted by your institution.

5. The project implementation location/site shall be selected in consideration with gram panchayat officials/ members.

6. Please take care that the position holders/Panchayat officials shall not be benefitted in person. Also, ensure that the project shall not be controversial in terms of beneficiaries. Selection of beneficiaries shall include the Marginalized communities or EWS Category as well.

7. Few videos and images shall be shared to the SEG Coordinator (for updating the status of the project), also the report shall contain good quality pictures of the project site/product/service and feedback from the villagers/beneficiaries.

8. For the projects related to training camps, awareness, rally etc., the in-charge shall share the material/posters/modules to be used in the villages, for the knowledge of SEG Coordinator and further comments, if any.

You are required to submit the completion report/5-6 photographs/3 min videos of the project within two months after the completion of the project to the competent authority of NCI-IIT Delhi, UBA2.0 cell. Without the submission of the completion report, the opportunity for funding of a new project will not be facilitated.

Prof. Vivek Kumar
National SEG Coordinator
Unnat Bharat Abhiyan (UBA 2.0)
National Coordinating Institute
Indian Institute of Technology, Delhi

उन्नत भारत अभियान
राष्ट्रीय समन्वय संस्थान
भारतीय प्रौद्योगिकी संस्थान दिल्ली
हौज़ खास, नई दिल्ली-११००१६
UNNAT BHARAT ABHIYAN
NATIONAL COORDINATING INSTITUTE
INDIAN INSTITUTE OF TECHNOLOGY DELHI
Hauz Khas, New Delhi - 110016
Website : http://unnat.iitd.ac.in

Prof. Virendra K. Vijay
National Coordinator, UBA
Professor CRDT, IITD

Tel. : +91-11-2659 1121/1157 (O)
Fax : +91-11-2659 1121
Email : unnatbharatabhiyaniitd@gmail.com
vkvijay@rdat.iitd.ac.in

Dear Sir/Madam,

Congratulations to all the Participating Institutions (PIs) selected under Unnat Bharat Abhiyan, a flagship program of Ministry of Human Resource Development (MHRD) Government of India through a challenge mode application. The Mission of Unnat Bharat Abhiyan is to enable participating higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth. It also aims to create a virtuous cycle between society and an inclusive academic system by providing knowledge and practices for emerging professions and to upgrade the capabilities of both the public and the private sectors in responding to the development needs of rural India.

As per the programme, educational institutions is primarily to develop linkage with selective rural clusters (preferably of five villages), to get involved in the planning process and to promote the requisite S&T interventions to improvise and expedite the developmental efforts in those clusters. The approach is a departure from the grant oriented method and would see the participation and commitment of faculty and students in this endeavour.

We shall be processing release of Rs. 10000/- per village under the UBA program. The funds are mainly meant for assistance for awareness, Gram Panchayat Development Plan (GPDP) study, need assessment, and contingency expenditure. There are provision of Rs 1.0 lakh for technological intervention/ solution and Rs 0.50/- lakh for customization of a technological solution under the program. Which you can avail of afterwards by submitting proposals with ratification of the Gramsabha. A two-way channel between PIs and National Coordinating Institute (NCI) as well as Subject Expert Groups (SEGs) for project proposal submission and evaluation has been developed and functional on UBA portal. You can use your login credential for uploading proposals on UBA website '**FINANCIAL AIDS** '. The login credentials are same as your registration login credentials.

You are also requested to keep IIT Delhi, the National Coordinating Institute updated about your activities so that the same can be uploaded on the website of UBA.

Regards and best wishes for your institution for contributing to India's development.

With regards

Your Sincerely,

Prof. Virendra K Vijay
National Coordinator,
Unnat Bharat Abhiyan

IRD IIT Delhi
IIT CAMPUS HAUZ KHAS

PAYMENT ADVICE

To
THE PRINCIPAL AND CHAIRMAN HIRASUGAR INSTITUTE OF TECHNOLOGY

Dear Sir/Madam,

S.J.P.N. Trust's Hirasugar Institute of Technology
Inward No. 147
Date 03/01/2023
Tal. Hukkeri, Dist. Belgaum.
NIDASOSHI.

Details of the transactions initiated through SBI CMP in favour of you are

PAYMENT_INVOICE_FIELDS	VALUES
JOURNAL_NUMBER	269545171
AMOUNT	1,00,000.00
DATE	30-12-2022
LINKAGE_FIELD	
AMOUNT	100000
TAX DEDUCTED	
PROJECT NO	
OUT REF NO	
DATE	
GROSS AMOUNT	100000
TOWARDS	PAYMENT TO PARTICIPATING INSTITUTE WORKING UNDER UBA VIDE GEN28593
BANK NAME	SBI
ACCOUNT NO	31868488488
IFSC CODE	SBIN0040302

Your Bank Account No: 31868488488

Your Bank IFSC Code: SBIN0040302

Please acknowledge receipt of the payment
For IRD IIT Delhi

Authorised Signatory
This is Computer generated advice and does not require any Signature

Hirasugar Institute of Technology
NIDASOSHI.
PIN-591236.
Dist:Belgaum.

RGSNToppanni
31/12/22

S. J. P. N. Trust's
Hirasugar Institute of Technology,
Nidasoshi - 591 236
Dist. : Belagavi. Karnataka.
"INCULCATING VALUES, PROMOTING PROSPERITY"
(Affiliated to Visvesvaraya Technological University, Belagavi.and Approved by All India Council for Technical Education, New Delhi.)
Accredited at "A" Grade by NAAC
Programs Accredited by NBA : CSE, ECE, EEE & ME.

Prof. S. C. Kamate Ph.D.
Principal

Ref. : HIT/NDS/UBA/2020-21/80 Date : 08/07/2020

To,
District Collector
Belgaum
Karnataka State

Sub: Identification of villages under the UBA Program.

Dear Sir,

Ministry of Human Resources Development (MHRD),Government of India has launched the national program called Unnat Bharat Abhiyan (UBA), with the vision to involve professional and higher educational institutions in the development process of rural areas in the country to achieve sustainable development and better quality of life. Indian Institute of Technology, Hauz Khas, New Delhi has been designated to be the National Coordinating Institute by the Ministry.

Our Institution **Hirasugar Institute of Technology, Nidasoshi** and AISHE Code C-1409 has agreed to participate in UBA as a Participating Institute (PI). Dr. S.N.Topannavar, Associate Professor, Mechanical Engineering Department, Mobile No. 9482440235, E-mail: sntopannavar.mech@hsit.ac.in has been duly authorized in this regard from our side to carry on the activities of UBA in our organization as Project Coordinator.

Under the UBA program every Participating Institute is to adopt a cluster of five villages in consultation with the District Collector. This is to bring to your kind notice that we have proposed the following villages in the Belgaum District.

1. Nidasoshi
2. Ammanagi
3. Boragal
4. Kesti
5. Hattarawat

In view of the above the Project Coordinator may contact your officer for the purpose. We request you to please help and cooperate in the matter.

With regards,

Your Sincerely,

Hirasugar Institute of Technology Nidasoshi Pin-591236 Dt. Belgaum

8/7/20.
Dr. S.C.Kamate
Principal

Copy to UBA IIT Delhi

Executive Summary of Implementation of Unnat Bharat Abhiyan Programs- 1.0 & 2.0

1. In July 2020 institute is decided to participate in the UBA-1.0 and adopted 5 nearby villages i) Nidasoshi ii) Ammanagi iii) Kesti iv) Borgal v) Hattarwat

2. In September, 2020, the Household and Village surveys are conducted in 5 adopted villages as per UBA prescribed format

3. The meeting of adopted villages Gram Panchayath Chairmans and PDOs are conducted and briefed them about the implementation and benefits of the UBA-1.0 .

4. 300+ students and 78+ staff are participated in surveys and survey's data are compliled and prepared report by the village conveyor. The reports and recommendations received from the Gram Panchayaths are discussed in the meetings of institute SEG and are analysed.

5. Total 5 Meetings were conducted with Institute UBA-SEG members and Adopted 5 villages' Gram Panchayat Chairmans, Members, PDOs and other functionaries and Participated in Gram Sabhas to recieve problems of villages

6. Under UBA-2.0, total 8 SEG Technology Development Projects proposals were prepared by 48 students and 17 faculty members and are submitted for financial support to UBA, out of 8, one SEG project has been received Rs. 1 Lakh fund from UBA-2.0 SEG IIT Delhi

7. The selected SEG Project on "Community Solar Dryer for Agro Products" has been completed and pilot model has been tested with sample farmers of adopted villages. The farmers suggestions are incorporated in the development of the project. Again tested with various available agro products. Lab testing completed and partially tested with agro products of selected farmers of adopted villages and received appreciations from farmers and Gram Panchayats.

8. The project has been completed successfully

18/12/23.

Dr.S.N.Topannavar
Principal Investigator: SEG Project &
UBA-1.0 & 2.0 Program Coordinator

28/12/23

Dr.S.C.Kamate
Principal

PRINCIPAL
Hirasugar Institute of Technology
Nidasoshi-591 236

Hirasugar Institute of Technology NIDASOSHI. PIN-591236. Dist:Belgaum.

Basic Information of the Project

Title of the Project:	Advanced Community Solar Dryer for Agro Products
Category:	Technology Development
Project No.:	RP-03525G
National Coordinating Institute	Indian Institute of Technology, Delhi
Name of villages where project development activities were carried out	5 Adopted villages are: 1. Nidasoshi 2. Ammanagi 3. Borgal 4. Kesti 5. Hattarwat
Aim/Objectives of the Project	1) To eliminate the unwanted and unpredictable food spoilage. 2) To study the characteristics and performance of the solar dryer system with continous feeding & outlet mechanism. 3) To develop a solar dryer system for quality ensured products. 4) To Design & Develop low cost & Product based Automated (Ardunio Controlled) Solar Cabinet Dryer for the welfare of Farmers & Food Processing Industries. 5) To achieve favorable temperature for various agri-products with different wetness with the help of effective Solar Tracking system.
Name of the Participating Institute (PI)	Hirasugar Institute of Technology, Nidasohsi
Address of the Participating Institute:	The Principal Hirasugar Institute of Technology, Nidasohsi Taluka: Hukkeri, Dist: Belagavi Karnataka PIN:591236 e-mail:principal@hsit.ac.in
Principal Investigator Name :	Dr.S.N.Topannavar
Principal Investigator Contact No. :	9482440235
UBA Coordinator Name	Dr.S.N.Topannavar
UBA Coordinator mail id :	sntopannavar.mech@hsit.ac.in
UBA Coordinator Contact No :	9482440235

Justification for the project

i) Problem Statement:

To study and develop a solar dryer in which the grains are dried continuously bycirculating heated air from the solar air heater with the help of manual solar tracking system. The problem of low, medium & large scale processor could be alleviated, if the solar dryer is designed and constructed with the consideration of overcoming the limitation of direct & indirect type of solar dryer. So therefore, this work will be based on importance of a solar dryer which is reliable and economically viable, adoptive design. The controlled drying of the various agro products with the help of the Arduniocontrolled parameters. The project will help the farmers to enhance their economy and drying problems of various agro products.

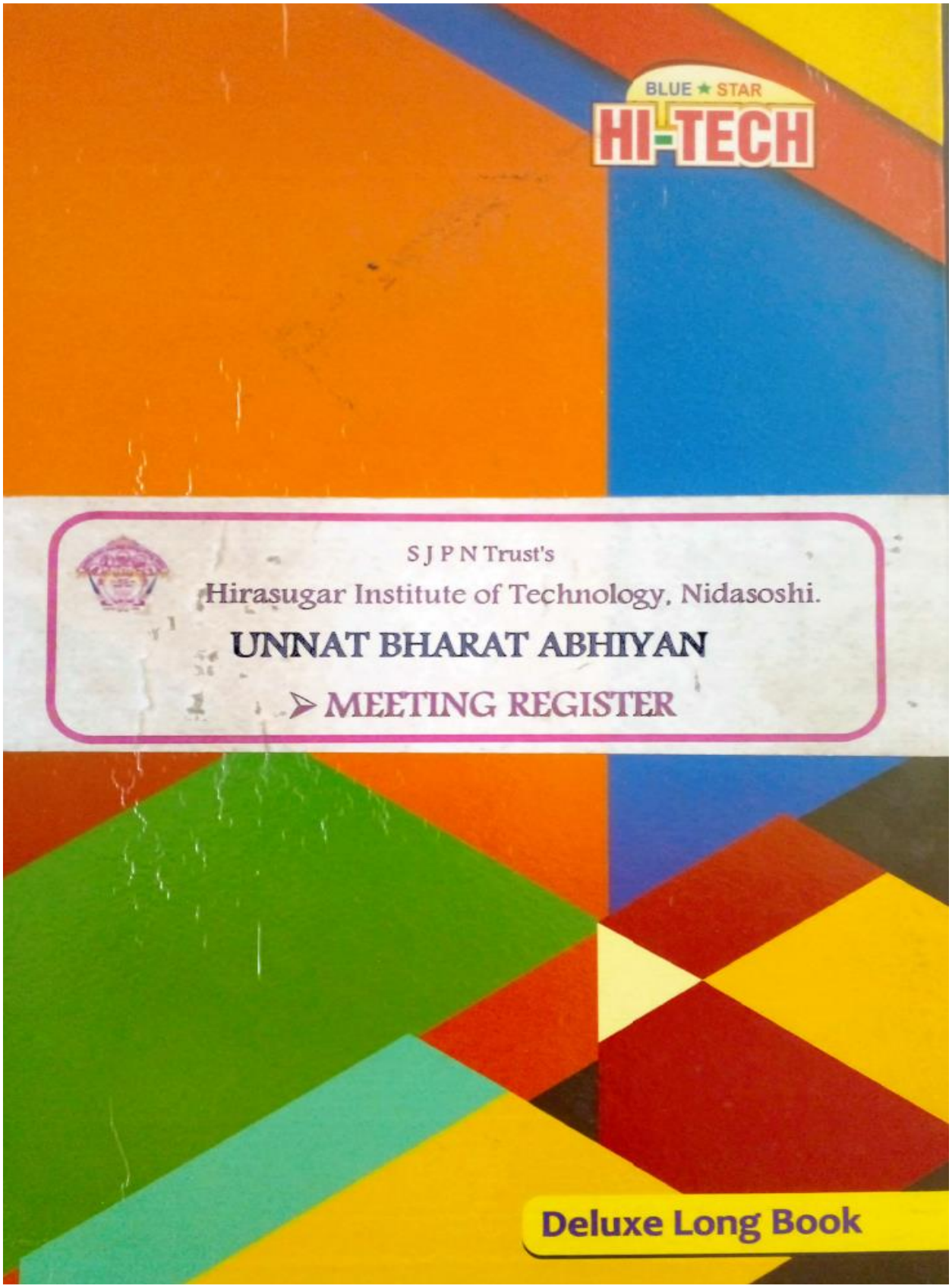
ii)Priority Needs:

1. The prime priority to the farmer for drying of grains, as they will receive benefit of this.
2. The Second Priority To Food Processing Industries To Increases The Food Quality.

iii) Proposed approach/Technical Intervention/customization:

- Visited to farm and had conversation with farmers aboutwhat problems they are facing.
- And we pointed to main problem which they were facing that was drying of grains.
- We can to know about how farmers dry they grains. They use to dry the grains on road side.
- And then we listed the problems which they were facing Problems like: unpredictable food spoilage, more time consumption&unwanted thing mixing with grains.

UBA SEG Meetings and Village & Household Surveys



UBA MEETING-03

Reference NO: HSIT/NDS/UBA-Meeting-03/2021-22
Date: 04.02.2022

A meeting of Subject Expert Group (SEG) members has conveyed on 04.02.2022 in the seminar hall at 3.00 PM.

The agenda of the meeting are as follows:

AGENDA:

1. Briefing of Meeting-02 Proceedings and implementations
2. Review of village and household survey reports.
3. Preparation of SEG propols for "Technology Development" and "Technology Customization"
4. Any other subjects with permission of chair.

PROCEEDINGS:

1. The minutes of the previous meetings are reviewed and discussed and it is decided to make a list of members of Subject Expert Groups (SEGs) based on the multidisciplinary and problem solving abilities. The Proposed composition is: Principal, All HODs, Department Project Co-ordinators, village & household survey co-ordinators and Frontline UBA volunteers (staff & students).
2. The reports of household survey co-ordinators and village surveys conducted in the adopted villages are reviewed. The possible solutions for the problems and recommendations are discussed. It is decided to study the best and suitable projects of the student (current & Previous).
3. With the reference to the e-mail on 30th Jan 2022 from Prof. Veerendra K. Vijay, National co-ordinator Unnat

department wise HOD and project co-ordinator level awareness has been conducted. Based on the expression of interest shown by the staff and students to prepare technology proposals for holistic development of the adopted villages, they are called in this meeting as "SECIs members". It is decided to submit proposals for Customized Technology and Technology development.

4. The village & Household survey co-ordinators and frontline UBA volunteers are requested to collect the useful information and documents from the adopted village Gram Panchayats (GPs).

The following Subject Expert Group members are present during the meeting.

S.No.	Name	Designation	Sign.
01.	Dr. S.C. Kamate	Principal	
02.	Dr. S.N. Topannavar	UBA - Program co-ordinator & HOD, ME	
03	Dr. B.V. Madiggond	HOD, EEE	
04	Dr. S.B. Akkole	HOD, E&E	
05	Prof. S.V. Manjaragi	HOD, CSE	
06	Prof. S.S. Patil	NSS Program officer	
07	Prof. M.I. Tanodi	UBA - Survey co-ordinator-Nidasoshi Project co-ordinator, MED	
08	Prof. Mahesh Yenagimath	Project co-ordinator - EEED	
09	Prof. D.B. Madihalli	UBA - Survey co-ordinator - Kesti	
10	Prof. Sujata. Kamate	Project co-ordinator - ECED	
11	Dr. R.R. Maggavi	Frontline staff volunteer, ECED	
12	Dr. Mahesh. Huddar	UBA - Survey co-ordinator - Kesti & Project co-ordinator - CSED	
13	Dr. K. M. Akkoli	UBA - Survey co-ordinator - Annawadi	
14	Prof. S A. Goudadi	UBA - Survey co-ordinator - Boragaon	
15	Mr. Amit. Therat & team	frontline student volunteer, MED	
16	Miss. Teju. Nigannavar & team	frontline student volunteer, ECED	
17	Mr. Kunal. Mane & Team	frontline student volunteer, EEED	

S.No.	Name	Designation	Sign.
22.	Sri. A. B. Sankeshwari	frontline staff volunteer, MED	
23.	Smt. Savitri. H. Baykud	Panchyat Development officer, Nidasoshi	
24.	Sri. Gopal. D. Karoshi	Panchyat Development officer, Ammanagi	
25.	Sri. S. J. Suryvanshi	Panchyat Development officer, Kesti	
26	Sri. B. B. Alagoowth	Panchyat Development officer, Boragal	
27.	Sri. Prabhu. Chamur	Panchyat Development officer, Hukkeri	
28.	Miss. Priya Kadakol & Team	frontline student volunteer, ECED	

04/01/2022
(Dr. S. N. Topannavar)
UBA. Program Coordinator

PRINCIPAL
Hirasugar Institute of Technology
Nidasoshi- 591 236


Heart Welcome
Chairmans & Panchayat
Development Officers (PDOs)
From Adopted Villages
64MP AI QUAD CAMERA


64MP AI QUAD CAMERA

ಗ್ರಾಮ ಪಂಚಾಯತ, ಕಾರ್ಯಾಲಯ,
ತಾಲೂಕಾ : ಹುಕ್ಕೇರಿ, ನಿಡಸೋಸಿ. ಜಿಲ್ಲೆ : ಬೆಳಗಾವಿ
OFFICE OF GRAM PANCHAYAT NIDASOSHI
Tal.Hukkeri Dist:Belagavi.-591236 (Karnataka)

Ref. No. G.P.N:NO.25: 2021-22 Date :16/02/2022

Appreciation Certificate

With reference to the UBA Meeting No.:HSIT/NDS/UBA-meeting-03/2021-22, Dated : 4th Feb. 2022, We are very much thankful to participating institute (PI) Hirasugar Institute of Technology, Nidasoshi for adopting our village Nidasoshi under Prime Minister Flagship program Unnat Bharat Abhyan. This is to certify that institute has been conducted collaborative village and household surveys of our village on 3rd-9th, September 2021 successfully.

We express our gratitude to the institute for considering our recommendations and findings of survey reports in the technology proposals of Subject Expert Groups (SEGs). We are happy to continue the same cooperation and coordination in future for the technology intervention of the institute for holistic development of our village.

PANCHAYAT DEVELOPMENT OFFICER
Gram Panchayat, NIDASOSHI
Tq Hukkeri Dt:Belagavi

ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ಜಿಲ್ಲಾ ಪಂಚಾಯತ ಬೆಳಗಾವಿ

ಗ್ರಾಮ ಪಂಚಾಯತ ಕಾರ್ಯಾಲಯ ಕೇಸ್ತಿ

ತಾ: ಹುಕ್ಕೇರಿ 591236 ಜಿ: ಬೆಳಗಾವಿ

Office Of Gram Panchayat Kesti

Tq-Hukkeri 591236 Di-Belgaum

Ref. No: GPK/2021.22 Date: 18/02/2022

Appreciation Certificate

With reference to the UBA Meeting No.:HSIT/NDS/UBA-meeting-03/2021-22, Dated : 4th Feb. 2022, We are very much thankful to participating institute (PI) Hirasugar Institute of Technology, Nidasoshi for adopting our village Kesti under Prime Minister Flagship program Unnat Bharat Abhyan. This is to certify that institute has been conducted collaborative village and household surveys of our village on 3rd-9th, September 2021 successfully.

We express our gratitude to the institute for considering our recommendations and findings of survey reports in the technology proposals of Subject Expert Groups (SEGs). We are happy to continue the same cooperation and coordination in future for the technology intervention of the institute for holistic development of our village.

PANCHAYAT DEVELOPMENT OFFICER
Gram Panchayat, KESTI
Tal Hukkeri Dist:Belgaum

ಗ್ರಾಮ ಪಂಚಾಯತ ಕಾರ್ಯಾಲಯ ಹತ್ತರವಾಟ

ತಾ: ಚಿಕ್ಕೋಡಿ, ಜಿ: ಬೆಳಗಾವಿ.

ಗ್ರಾ.ಪಂ.ಹ/ವಿವ/9/2021-22 ದಿನಾಂಕ:-19 FEB 2022

Appreciation Certificate

With reference to the UBA Meeting No.:HSIT/NDS/UBA-meeting-03/2021-22, Dated : 4th Feb. 2022, We are very much thankful to participating institute (PI) Hirasugar Institute of Technology, Nidasoshi for adopting our village Nidasoshi/ Ammanagi/ Borgal/Kesti/Hattarwatunder Prime Minister Flagship program Unnat Bharat Abhyan. This is to certify that institute has been conducted collaborative village and household surveys of our village on 3rd-9th, September 2021 successfully.

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ಸೇವಾಯಿತ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿಗಳು
ಗ್ರಾಮ ಪಂಚಾಯತ, ಹತ್ತರವಾಟ.

Students and Staff Participation and Involvement

S J P N Trust's
Hirasugar Institute of Technology, Nidasoshi
Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi.
Accredited at 'A' Grade by NAAC
Programmes Accredited by NBA: CSE, ECE, EEE & ME

Institute
Social Activities
UBA
AY:2021-22

Unnat Bharat Abhiyan (UBA)

Subject Expert Group (SEG) Members

(Ref: UBA Meeting No-03 No.:HSIT/NDS/UBA-Meeting-03/2021-22. Dated: 4th Feb. 2022)

S.N.	Name	Designation	Signature
1	Dr.S.C.Kamate	Principal	
2	Dr.S.N.Topannavar	UBA-Program Coordinator & Head of the Department-ME	
3	Dr. B.V.Madiggond	Head of the Department-EEE	
4	Dr. S.B,Akkole	Head of the Department -ECE	
5	Prof.S.V.Manjaragi	Head of the Department -CSE	
6	Prof.S.S.Patil	NSS Program Officer	
7	Prof.M.I.Tanodi	UBA-Survey Coordinator-Nidasoshi & Project Coordinator, MED & Institute KSCST/VTU project coordinator	
8	Prof.Mahesh Yanagimath	Project Coordinator-EEED	
9	Prof.D.B.Madhihalli	UBA-Survey Coordinator-Kesti	
10	Prof.Sujata Kamate	Project Coordinator-ECED	
11	Dr.R.R.Maggavé	Frontline Staff Volunteer, ECED	
12	Dr.Mahesh Huddar	UBA-Survey Coordinator-Kesti & Project Coordinator-CSED	
13	Dr.K.M.Akkoli	UBA-Survey Coordinator-Ammanagi	
14	Sri.S.B.Sarwadi	UBA-Survey Coordinator-Hattarwat	
15	Prof.S.A.Goudadi	UBA-Survey Coordinator-Borgal	
16	Mr.Amit Thorat & Team	Frontline Student Volunteer, MED	
17	Miss. Teju Niganure & Team	Frontline Student Volunteer, ECED	
18	Mr. Kunal Mane & Team	Frontline Student Volunteer, EEED	
19	Mr. Kasim Jakati	Frontline Student Volunteer, CSED	
20	Sri.Bardol R.S.	Frontline Staff Volunteer, EEED	
21	Sri.G.B.Dodagoudar	Frontline Staff Volunteer, 1st Year Dept.	
22	Sri.A.B.Sankeshwari	Frontline Staff Volunteer, MED	
23	Smt.Savitri H.Baykud	Panchayat Development Officer, Nidasoshi	
24	Sri.Gopal D. Karoshi	Panchayat Development Officer, Ammanagi	
25	Sri.S.J.Suryvanshi	Panchayat Development Officer, Kesti	
26	Sri.B.B.Alagrowth	Panchayat Development Officer, Borgal	
27	Sri. Prabhu Channur	Panchayat Development Officer, Hattarwat	
28	Miss. Priya Kadakol & Team	Frontline Student Volunteer, ECED	

Dr.S.N.Topannavar
UBA Program Coordinator

Hirasugar Institute of Technology NIDASOSHI PIN-591236 Dist:Belgaum

Dr.S.C.Kamate 4/2/22
Principal
PRINCIPAL
Hirasugar Institute of Technology
Nidasoshi- 591 236

S J P N Trust's
Hirasugar Institute of Technology, Nidasoshi.
Inculcating Values, Promoting Prosperity
Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi.
Accredited at 'A' Grade by NAAC
Programmes Accredited by NBA: CSE, ECE, EEE & ME

Unnat Bharat Abhiyan (UBA)
Village & Household Survey
AY:2020-21

Unnat Bharat Abhiyan (UBA)-Village and Baseline Household Survey

(Ref: Volunteer Participation through Google form, Awareness Program and constituted STT)

- With reference to the above Survey Teams for 5 adopted villages have been constituted to complete UBA-Village Survey and UBA-Baseline Household Survey.

List of Staff Members for the village Nidasoshi

S.N.	Name	Designation	Department	Mobile Number	Signature
1	Mahantesh Tanodi	Assistant Professor & Convenor	ME	9611998812	
2	S.I.Ittannavar	Assistant Professor & Convenor	ECE	9964299498	
3	Rajendra S Bardol	Instructor & Convenor	EEE	8277010328	
4	Maheshwar A Hipparagi	Assistant Professor	ME	7411507405	
5	Sujata Huddar	Assistant Professor	EEE	9742066852	
6	M.M.Shivashimpi	Assistant professor	ME	9742197173	
7	Mohan Futane	Assistant Professor	ME	9164105035	
8	Sunita Malaj	Assistant Professor	ECE	8073529095	
9	Manjunath S Hanagadakar	Associate Professor	1st Year	8310768223	
10	Ravindra Patil	Assistant Professor	CSE	9845455422	
11	Keshav Negalur	Assistant professor	EE	7619165884	
12	Shivanand Hirekodi	Assistant Professor	EEE	8073543248	
13	K.B. Manwade	Associate professor	CSE	8412968254	
14	Amit Nesti	Assistant Professor	EEE	9606703174	
15	Pratima Khot	Assistant Professor	ECE	9964019501	
16	Mohan A. Gholap	Assistant Professor	CSE	8660535525	
17	Aruna Anil Daptardar	Assistant Professor	CSE	9620851002	
18	Annappa R Bhiste	Instructor	CSE	9538170337	
19	Anand K Badakar	Assistant Programmer	CSE	9980283608	
20	Manojkumar Chitale	Assistant professor	CSE	9480787474	
21	N.K.Honnagoudar	Assistant Professor	CSE	9449495302	

List of Staff Members for the village Ammanagi

S.N.	Name	Designation	Department	Mobile Number	Signature
1	K. M. Akkoli	Associate Professor & Convener	ME	9739114856	
2	Shivanand V Manjaragi	Assistant Professor & Convener	CSE	9986658309	
3	V.G.Badiger	Forman & Convener	ME	9739114857	
4	G.B.Dodagoudar	Instructor & Convener	1st Year	9886361216	
5	Darshan N Inamdar	Assistant professor	ME	9591208980	
6	Nyamatulla M Patel	T & P Officer	CSE	9739619661	
7	Virupakshi M Bhumannavar	Assistant Professor	1st Year	9448526988	
8	Chandrakant R Belavi	Assistant Professor	CSE	7829241219	

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9	Mahesh Huddar	Assistant Professor	CSE	7411043272	
10	Mahesh Yenagimath	Assistant Professor	EEE	9341449466	

List of Staff Members for the village Borgal

S.N.	Name	Designation	Department	Mobile Number	Signature
1	S.A.Goudadi	Assistant Professor & Convener	ME	9448876682	
2	M.G.Huddar	Assistant Professor & Convener	CSE	7411043272	
3	Pramod Desai	Forman & Convener	ECE	9620024724	
4	Chetan Jodatti	Instructor	T & P	9535421165	
5.	H.R. Zinage	Asst. Prof	EEE	8073512609	

List of Staff Members for the village Hattarwat

S.N.	Name	Designation	Department	Mobile Number	Signature
1	S.B.Sarwadi	Physical Director & Convener	Sports	9739109383	
2	Ashok Bennoli	Instructor & Convener	CSE	7829847451	

List of Staff Members for the village Kesti

S.N.	Name	Designation	Department	Mobile Number	Signature
1	D. B. Madihalli	Assistant Professor & Convener	ECE	9902854324	
2	G.S.Solabannavar	Librarian & Convener	Other	7204183589	
3	Pramod Murari	Assistant Professor	EEE	9739733021	
4	Sujata S. Kamate	Assistant Professor	ECE	9008696825	
5	Dattatray M Kumbhar	Assistant professor	ECE	7353545488	
6.	O.B. Heddurshett	Asst. Prof.	EEE	9448420509	

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Unnat Bharat Abhiyan (UBA)
Village & Household Survey
AY:2020-21

List of Student Volunteers for all 5 Adopted Villages

S.N.	Name	USN	Sem	Mobile	Native	Signature
1.	Mahantesh Hiremath	2HN19ME407	VI	7026797668	Ilkal	
2.	Vivekananda C Kambi	2HN18ME048	VI	7406124053	Mamadapur	
3.	Nikita M. Hattarki	2HN19EC013	IV	7558606474	Daddi	
4.	Priyanka Dattawade	2HN19EC014	IV	9972036805	Mekhali	
5.	Maruti A Magadum	2HN19EC011	IV	9986095368	Madamakkanal	
6.	Sharanabasapp M Chalikar	2HN19CS038	IV	8088505552	Bhairamadagi	
7.	Prasad Hiremath	2HN19CS027	IV	9448163822	Belgaum	
8.	Nagadarshan Kopparad	2HN19EE009	IV	7259290709	Ilkal	
9.	Sohail Yargatti	2hn17me050	VI	7996227934	Belgaum	
10.	Apoorva Magadum	2HN19EC003	IV	9632562486	Hukkeri	
11.	Divya Karigar	2HN19EC005	IV	8310452546	Sankeshwar	
12.	Aishwarya Gundoli	2HN18CS001	VIII	7259550923	Sunadholi	
13.	Suraj S Drakshe	2HN19EE012	IV	9513794305	Hirekodi	
14.	Rutuja Shetti	2HN19EC019	IV	8431728625	Raibag	
15.	Laxmi Bedage	2HN19EC010	IV	9740832840	Yadurwadi	
16.	Kallappa Ningappa Chikodi	2HN19EC009	IV	7619154326	Donwad	
17.	Nivedita L Udapudi	2HN19CS020	IV	8073723423	Gokak	
18.	Ajinkaykumar Sambhaji Bhosale	2HN18ME005	VI	6360103570	Nipani	
19.	Anupriya B Mugalkhod	2HN20CS400	IV	9148364195	Terdal	
20.	Nihal Siraj Shaikh	2HN19CS037	IV	9307937437	Miraj	
21.	Pradeep Raghannavar	2HN19CS023	IV	8431640988	Junnur	
22.	Vineet Gandolli	2HN19CS048	IV	8951612633	Gokak	
23.	Sneha S Hirekodi	2HN19CS040	IV	9606783195	Kanagala	
24.	Kartik Kumbar	2HN19CS015	IV	6364328002	Chikodi	
25.	Rohit Mali	2HN19CS030	IV	7406462547	Mangasuli	
26.	Solapure Amrut Basavaraj	2HN19CS042	IV	7620836378	Nilagi	
27.	Ashwini Maled	2HN18CS005	IV	8105762541	Lokapur	
28.	Harfa I Mujawar	2HN19CS014	IV	8105561244	Gokak	
29.	Sahana Naik	2HN19CS031	IV	9731518120	Radderahatti	
30.	Soumya Kadam	2HN19CS043	IV	9380204414	Athani,	
31.	Amruta Gudimani	2HN19CS005	IV	8722913597	Hirekodi,	
32.	Padma Borannvar	2HN19CS021	IV	8105158323	Bellad bagewadi	
33.	Akshata K M	2HN19CS004	IV	6361736284	Janawad	
34.	Keerti C Chajagoud	2HN19CS016	IV	8660163381	Karoshi	
35.	Muzammil Patel	2HN19CS019	IV	7204947143	Bijapur	
36.	Suprita Sindhur	2HN19CS045	IV	9743634531	Kakamari	
37.	Akshay Salagare	2HN19EC001	IV	7026375395	Nilaji	
38.	Ganesh Managuli	2HN19EC006	IV	8073373098	Nagarmunnoli	

39.	Ramakrshna K. Magadum	2HN18ME031	VIII	9844519754	Kamatanur	
40.	Ramesh Manjaragi	2HN20ME403	IV	6362315826	Ammanagi	
41.	Hasansab S. Yaragatti	2HN18ME013	VIII	9380648988	Gokak	
42.	Sudharani B Kurani	2HN18CS037	VI	7676839549	Teerth	
43.	Ashwathraj Nerli	2HN19CS007	IV	9902535217	Chikodi	
44.	Seema Tugadalli	2HN19CS036	IV	9663234355	Mugalkhod	
45.	Pranav Gaddi	2HN19CS026	IV	8861909177	Sankeshwar	
46.	Sunil Sutar	2HN20CS403	IV	9535164295	Sankeshwar	
47.	Sneha Shitole	2HN19CS039	IV	9535554899	Borgaon	
48.	Swati Patil	2HN18CS039	VI	9611870374	Hukeri	
49.	Daneshwari J Sultanpure	2HN19CS011	IV	7899707537	Sankeshwar	
50.	Meenaxi Baad	2HN20CS401	IV	7090513882	Nidasoshi	
51.	Sneha Patil	2HN19CS400	VI	9071654955	Sankeshwar	
52.	Tehamim.M.Rehamanbhai	2HN19EE013	IV	8971095318	Chikodi	
53.	Sneha V Ganachari	2HN19CS041	IV	7996010238	Hukkeri	
54.	Smita Manoli	2HN18CS033	VI	8971885532	Nidasoshi	
55.	Vishakha Vijay Nesari	2HN18CS045	VI	7019631053	Sankeshwar	
56.	Rajat Naganur	2HN18EE015	VI	6361907448	Bailhongal	
57.	Chinna Yashawant	2HN18EE005	VI	8867487798	Borgal	
58.	Shashidhar Gurav	2HN19ME010	IV	7337853480	Borgal	
59.	Shivaprasad Ammnagi	2HN18ME036	VI	7022403970	Nandagao (savalagi)	
60.	Chetan Karigar	2HN16ME017	VI	8073789383	Chikodi	
61.	Mahadev Rama Gulli	2HN19ME007	IV	9686755257	Bidrewadi,	
62.	Vimarsha Pujari	2hn20ec044	II	8217664206		
63.	Swati Kupati	2HN20EC041	II	7483898619	Hattargi	
64.	Sushmita Tanodi	2HN20EC040	II	7204944241	Nidasoshi	
65.	Nayana Patil	2HN20CV002	II	7411013397		
66.	Sneha Sadalagi	2HN20EC038	II	6360136267	Hebbal	
67.	Shravana Bastwadi	2HN20EC033	II	6361231755	Kochari	
68.	Gouri Mathapati	2HN20EC010	II	7483554619	Ammanagi	
69.	Sapna Naik	2HN20EC031	II	7019411717	Beniwad	
70.	Nilambari Arakeri	2HN20ec019	II	8904021345		
71.	Aishwarya Dudaganvi	2HN20ec004	II	9529879633	Venkamuri	
72.	Samrudhi Kulkarni	2HN20EC029	II	9740984467	Nipani	
73.	Poornima Shindhe	2HN20EC023	II	7975748665	Shedbal	
74.	Neha Bhujagoudar	2HN20EC018	II	8951603108	Shedbal	
75.	Priyanka Gharagude	2HN20EC025	II	7676376867	Jainapur	
76.	Madhuja Khot	2HN20EC014	II	8792682039	Borgaonwadi	
77.	Komal Chavan	2HN20EC012	II	9741945017	Yadur	
78.	Saraswati Baldoal	2HN20EC032	II	9591492134	Gokak	

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79.	Arati Bugadikatti	2HN20EC007	II	8867043539	Ingali	Arati
80.	Neelambika Govindapuramath	2HN20EC017	II	7022017720	Mudhol	
81.	Ashwini Patil	2HN20EC008	II	8867446947	Belgavi	
82.	Tejashri Patil	2HN20EC042	II	7975123008	Bhivashi	Patil
83.	Shweta Mangasole	2HN20EC036	II	8880875484	Shamanewadi	Mangsole
84.	Shrutika Dhang	2HN20EC035	II	8277303726	Ugar.Kh	
85.	Sanika Patil	2HN20EC030	II	988059561	Shiradwad	
86.	Sneha Belagali	2HN20EC037	II	7892380575	Yadur	Belagali
87.	Shruti Magadum	2HN20EC034	II	7338240933	Kesti	Magadi
88.	Sneha Munnoli	2HN20EC039	II	9591353167	Kesti	Munnoli
89.	Veena Magadum	2HN20EC043	II	7975788522	Nasalapur	
90.	Jyoti Benawadi	2HN20ee007	II	9591553515	Nlaganur km.	
91.	Rashmi Malagoudnavar	2HN20ee013	II	9964188688	Yallimunoli	
92.	Saniya Choudhari	2HN20ee014	II	8073773604	Hukkeri	
93.	Swati Padipatil	2HN20EE018	II	9353981399		
94.	Sinran Attar	2HN20EE016	II	8147059773	Kaguad	
95.	Saraswati Bolabala	2HN20EC032	II	9591492134	Gokak	
96.	Nikita Hattaski	2HN19EC013	II	7558606474	Daddi	
97.	Sneha Sadalagi	2HN20EC038	II	6360136267	Hubbal	Sadalagi
98.	Shravan Bastawadi	2HN20EC033	II	6361231755	kochari	
99.	Kallappa Chikodi	2HN19EC007	IV	7619154326	Donwad	
100.	Maruti Magadum	2HN19EC011	IV	9986095368	[illegible]	
101.	Ganesh Managuli	2HN19EC006	IV	8073373098	Nagarmunnoli	
102.	Rohit Mali	2HN19CS030	IV	7406462547	mangsuli	Mali
103.	Gouri Mathapati	2HN20EC010	II	7483554619	Ammanagi	
104.	Sushank Hawaldar	2HN18EE023		7483124693		
105.	Akhilesh Patil	2HN18EE001		9449127367		
106.	Ashwat Karadigudd	2HN18EE003		7760406281		
107.	Sanjay Mannikeri	2HN18EE019		7204688187		
108.	Sourabh Sannakki	2HN19EE403	IV	7349377508		
109.	Shashikant Ninganagoudar	2HN18EE021		9606509925		
110.	Naeenkumar Gokanvi	2HN19EE401	IV	8095424048		
111.	Rajat Naganur	2HN18EE015		6361907448		
112.	Nikhil Nandigon	2HN18ME020	VII	6361913612	Jamakhandi	
113.	Akash B V	2HN18ME006				
114.	Ganesh Managanvi					
115.	Rohit Mali					
116.	Archana Mgulli	2HN19ME003	IV			
117.	Ayesha Sayyad	2HN18ME001				
118.	Shweta Manyare	2HN20EC038	II	8880875484	Shamnewadi	SManyare

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AY:2020-21

119.	Shrutika Dhang	2HN20EC035	II	8277303726	Ugar. Kh	
120.	Tejashri Patil	2HN20EC042	II	7975123008	Bhivashi	
121.	Madhuja Khot	2HN20EC014	II	8792682039	Borg aonwadi	
122.	Sneha Belagali	2HN20EC037	II	7892380575	Yadur	
123.	Sanika Munnoli	2HN20EC030	II	9880594561	Shirdawad	
124.	Sneha Munnoli	2HN20EC039	II	9591353167	Kesti	
125.	Shruti Magadum	2HN20EC034	II	7338240933	Kesti	
126	Nikhil Ushet	2HN18ME021	VII	7996168131	Chikodi	

The above staff And student volunteers are requested to conduct & complete House-hold & Village Surveys 1st and 2nd week of September 2021 in the all 5 adopted villages in the UBA-prescribed format. All are also requested to submit the Analysis, Summary, Attendance and Special observations/recommendations for holistic development of respective village in consultation with key persons of the respective village in the prescribed format.

24/08/2021

Dr.S.N.Topannavar
UBA-Coordinator of PI

Hirasugar Institute of Technology NIDASOSHI. PIN-591236. Dist:Belgaum.

Dr.S.C.Kamate
Principal
PRINCIPAL
Hirasugar Institute of Technology
Nidasoshi- 591 236

Unnat Bharat Abhiyan

Volunteers' Participation in Village and Household Survey Conducted during 3rd – 9th September 2021

Adopted Village: Nidasoshi


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Survey of NIDASOSHI


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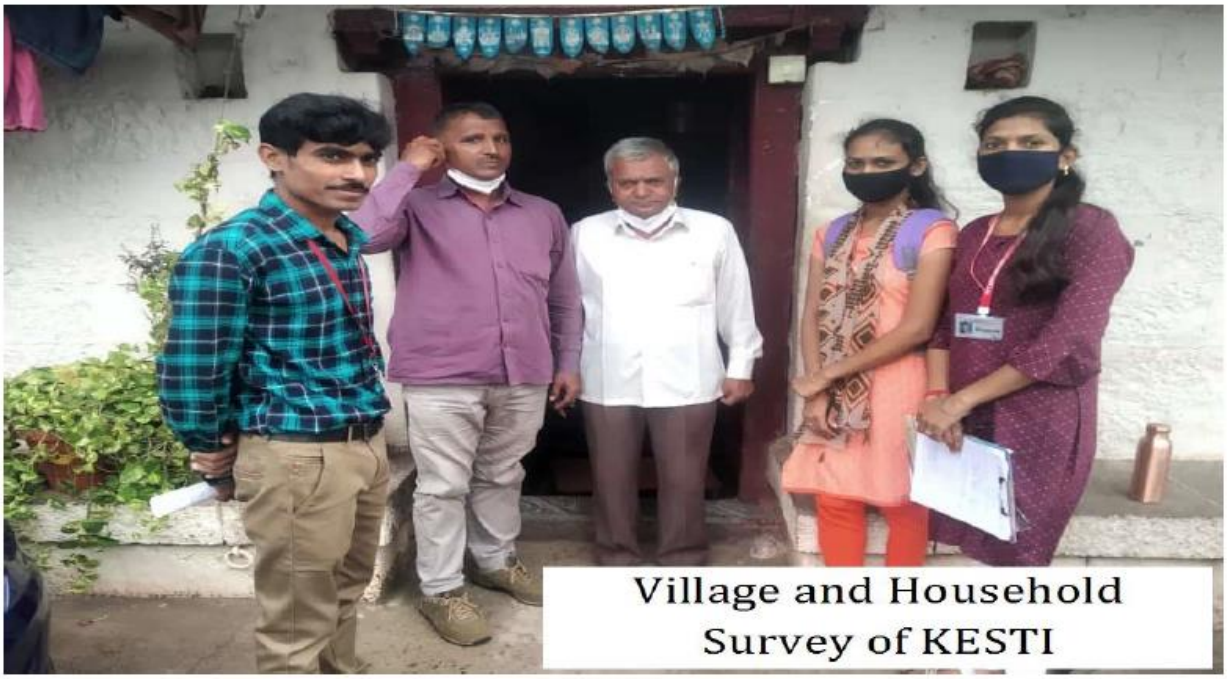
Village and Household
Survey of NIDASOSHI

Adopted Village: Ammanagi

Adopted Village: Kesti



Adopted Village: Borgal

Adopted Village: Hattarwat

Village and House Hold Survey Reports and Recommendations

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Institute
UBA
Report
AY:2021-22

UNNAT BHARAT ABHIYAN (UBA) Baseline Household Survey Report

We Mr. Mahantesh Tanodi and Mr. S. S. Itannavar along with Students, faculty and Staff members of Hirasugar Institute of Technology, were attended **UNNAT BHARAT ABHIYAN Survey** at **NIDASOSHI** on **03/09/2021**. Household and Village survey of about **530 Nos**. of Houses was carried out. The observations during the visit are listed below.

1. No Government Veterinary Hospital.
2. No proper utilization of Common toilets by local people.
3. More dependent on Non-renewable energy resources.
4. Cow/ Buffalo dung disposal issues.
5. No Community hall /Storage for Agricultural Products.
6. Lack of irrigation facilities for farms.
7. Lack of continuous Power supply for farmers.
8. No proper water level monitoring system for Gram Panchayat Overhead water storage tank. (Wastage of water during filling)
9. Conventional method of cultivating and Harvesting of crops.
10. More utilization of pesticides.

Conveners
(UBA Nidasoshi Village)

ಪಂಚಾಯತ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿಗಳು
ಗ್ರಾಮ ಪಂಚಾಯತ, ನಿಡಸೋಶಿ
ತಾ.ಹುಕ್ಕೇರಿ ಜಿ.ಬೆಳಗಾವಿ

Nidasoshi-591 236, Taq: Hukkeri, Dist: Belagavi, Karnataka, India.
Phone: +91-8333-278887, Fax: 278886, Web: www.hsit.ac.in, E-mail: principal@hsit.ac.in

Summaries of made during Village & Household Survey of Unnat Bharat Abhiyan

From the description, we were able to analyze few points on which the village is lacking behind and needs to be worked upon.

1) Health – proper hospitality in the village gives some benefits under the different government schemes.
2) Roads – The roads are very narrow. Many of the roads being good in condition lack speed breakers. People driving vehicles fast, causes many accidents.
3) Education System – There is a desperate need for higher educational establishment in the village.
4) Toilet facilities, sewage treatment, waste collection etc must be made appropriate and up to date for betterment of their lifestyle & health.
5) There are so many pension schemes. But people are unaware of those schemes due to which they lost their pension payments.

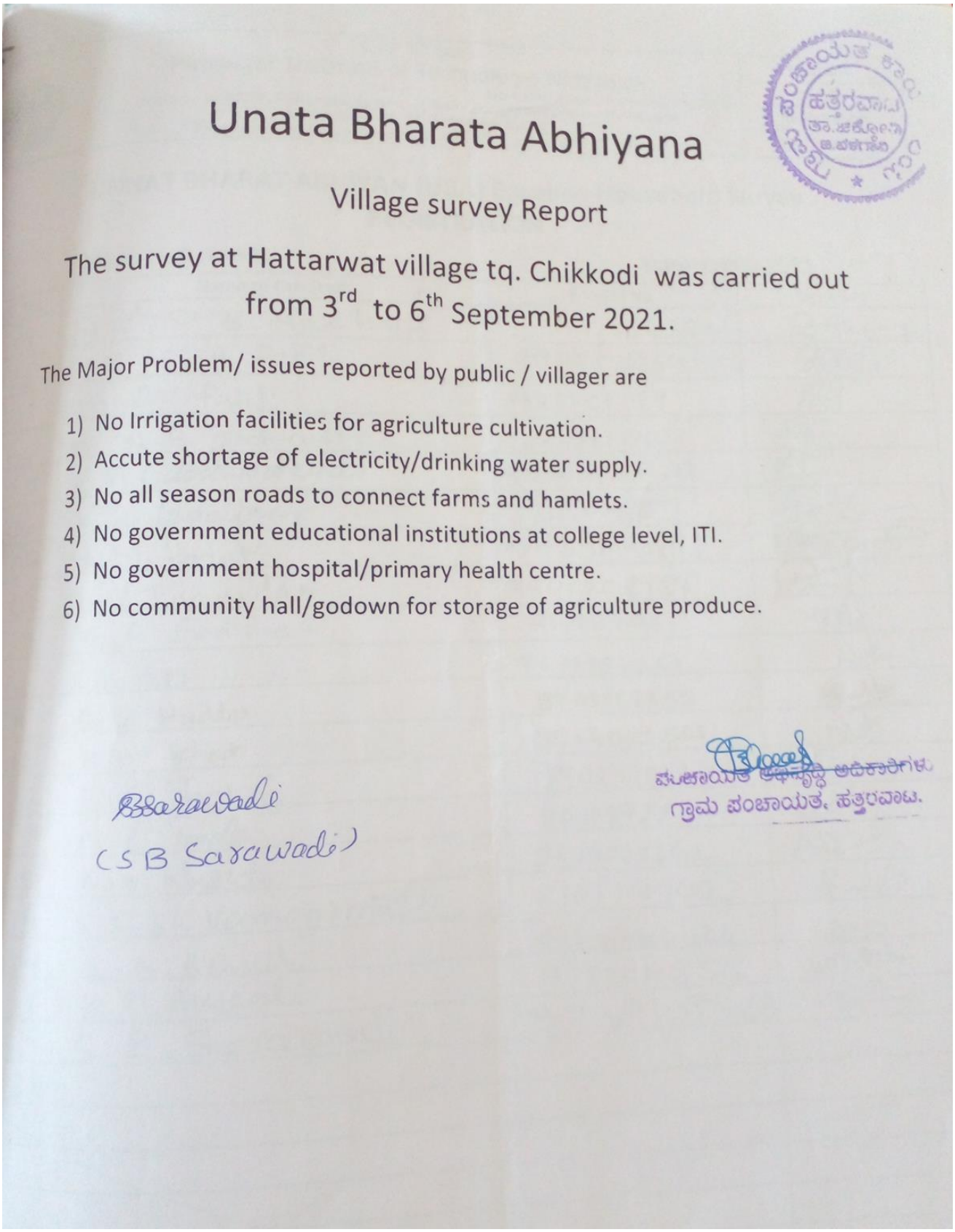
There are many more problems for which solutions must be taken seriously for the betterment of people & development of village.

Prof. D. B. Madihalli
Village & Household Survey Coordinator
Unnat Bharat Abhiyan
Kesti

Hirasugar Institute of Technology Nidasoshi PIN-591 236 Dist. Belagavi

29/4/2021
Dr. S. N. Topannavar
Programme Coordinator
Unnat Bharat Abhiyan

ಪಂಚಾಯತ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಗ್ರಾಮ ಪಂಚಾಯತ, ಕೇಸ್ತಿ
ತಾ.ಹುಕ್ಕೇರಿ ಜಿ.ಬೆಳಗಾವಿ



Unata Bharata Abhiyana

Village survey Report

The survey at Hattarwat village tq. Chikkodi was carried out from 3rd to 6th September 2021.

The Major Problem/ issues reported by public / villager are

1) No Irrigation facilities for agriculture cultivation.
2) Accute shortage of electricity/drinking water supply.
3) No all season roads to connect farms and hamlets.
4) No government educational institutions at college level, ITI.
5) No government hospital/primary health centre.
6) No community hall/godown for storage of agriculture produce.

Saravadi
(S B Saravadi)

ಗ್ರಾಮ ಪಂಚಾಯತ, ಹತ್ತರವಾಟ.

Summaries of observations made during Village & Household Survey of Unnat Bharat Abhiyan

From the description, we were able to analyze few points on which the village is lacking behind and needs to be worked upon.

1) Pure Drinking Water-supply of drinking water can be made available to all the houses.
2) Electricity Supply-Continuous electricity facility can be made available to farmers to improve their earnings.
3) Health – proper hospital facility can be made available in the village which gives some benefits under the different government schemes.
4) Roads – The roads are very narrow and may be the quality of roads can be improved.
5) Education System – There is a desperate need for higher educational establishment in the village.
6) Toilet facilities, sewage treatment, waste collection etc must be made in appropriate way and maintenances of the above facilities for betterment of their lifestyle & health.
7) Banking Facilities-banking facilities can be improved through the awareness and educating the people about the various government schemes and facilities.

There may be many more problems for which solutions might be available for the betterment of people & development of village.

Prof. S. A. Goudadi
Borgal Village & Household Survey Coordinator
Unnat Bharat Abhiyan

Dr. S. N. Topannavar
Programme Coordinator
Unnat Bharat Abhiyan

Hirasugar Institute of Technology NIDASOSHI PIN-591236 Dist:Belgaum

ಪಂಚಾಯತ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿಗಳು
ಗ್ರಾಮ ಪಂಚಾಯತ ಬೋರಗಲ್ಲ
ತಾ.ಹುಕ್ಕೇರಿ ಜಿ.ಬೆಳಗಾವಿ

Introduction of SEG project:
Advance Community Solar Dryer for Agro-Products

1.1 INTRODUCTION TO SOLAR DRYER

Drying is one of the methods used to preserve food products for longer periods. The heat from the sun coupled with the wind has been used to dry food for preservation for several thousand years.Solar thermal technology is rapidly gaining acceptance as an energy saving measure in agriculture application. It is preferred to other alternative sources of energy such as wind and shale, because it is abundant, inexhaustible, and non–pollution. Solar air heaters are simple devices to heat air by utilization solar energy and it is employed in many applications requiring low to moderate temperature below 80C, such as crop drying and space heating.

Drying is the oldest preservation technique of agricultural products and it is an energy intensive process. High prices and shortages of fossil fuels has increased the emphasis on using alternative renewable energy resources. Drying of agricultural products using renewable energy such as solar energy in environmentally friendly and has less environmental impact. Different type of solar dryers has been designed, developed and tested in the different regions of the tropics and subtropics. The major two categories of the dryers are the natural convection solar dryers and forced convection solar dryers. In the natural convection solar dryers, the air flow is established by buoyancy induced airflow while in forced convection solar dryers the air flow is provided by using fan operated either by electricity/solar module or fossil fuel. Now the solar dryer designed and developed for and used in tropics and subtropics are discussed under two headings.

1.2 SOLAR RADIATION-THE ENERGY SOURCE FOR SOLAR DRYING

Energy is important for the existence and development of human kind and is a key issue in international politics, the economy, military preparedness, and diplomacy. To reduce the impact of conventional energy sources on the environment, much attention should be paid to the development of new energy and renewable energy resources. Solar energy, which is environment friendly, is renewable and can serve as a sustainable energy source. Hence, it will certainly become an important part of the future energy structure with the increasingly drying up of the terrestrial fossil fuel. However, the lower energy density and seasonal

doing with geographical dependence are the major challenges in identifying suitable applications using solar energy as the heat source. Consequently, exploring high efficiency solar energy concentration technology is necessary and realistic.

Solar energy is free, environmentally clean, and therefore is recognized as one of the most promising alternative energy recourses options. In near future, the large-scale introduction of solar energy systems, directly converting solar radiation into heat, can be looked forward. However, solar energy is intermittent by its nature, there is no sun at night. Its total available value is seasonal and is dependent on the meteorological conditions of the location. Unreliability is the biggest retarding factor for extensive solar energy utilization. Of course, reliability of solar energy can be increased by storing its portion when it is in excess of the load and using the stored energy whenever needed. Solar drying is a potential decentralized thermal application of solar energy particularly in developing countries. However, so far, there has been very little field penetration of solar drying technology. In the initial phase of dissemination, identification of suitable areas for using solar dryers would be extremely helpful towards their market penetration.

Solar drying is often differentiated from sun drying by the use of equipment to collect the sun's radiation in order to harness the radiated energy for drying applications. Sun drying is a common farming and agricultural process in many countries, particularly where the outdoor temperature reaches 30°C or higher. In many parts of South East Asia, spices and herbs are routinely dried. However, weather conditions often preclude the use of sun drying because of spoilage due to rehydration during unexpected rainy days. Furthermore, any direct exposure to the sun during high temperature days might cause case hardening, where a hard shell develops on the outside of the agricultural products, trapping moisture inside. Therefore, the employment of solar dryer taps on the freely available sun energy while ensuring good product quality via judicious control or the radiated heat. Solar energy has been used throughout the world to dry products. Such as the diversity of solar dryers that commonly solar-dried products include grains, fruits, meat, vegetables and fish. A typical solar dryer improves upon the traditional open-air sun system in five important ways.

It is faster. Materials can be dried in a shorter period of time. Solar dryers enhance drying times in two ways. Firstly, the translucent, or transparent, glazing over the collection area traps heat inside the dryer, raising the temperature of the air. Secondly, the flexibility or enlarging the solar collection area allows for greater collection of the sun's energy. It is more efficient. Since materials can be dried more quickly, less will be lost to spoilage immediately after harvest. This is

especially true of products that require immediate drying such as freshly harvested grain with high

moisture content. In this way, a larger percentage of products will be available for human consumption. Also, less of the harvest will be lost to marauding animals and insects since the products are in safely enclosed compartments.

It is hygienic. Since materials are dried in a controlled environment, they are less likely to be contaminated by pests, and can be stored with less likelihood of the growth of toxic fungi. It is healthier. Drying materials at optimum temperatures and in a shorter amount of time enables them to retain more of their nutritional value such as vitamin C. An added bonus is that products will look better, which enhances their marketability and hence provides better financial returns for the farmers. It is cheap. Using freely available solar energy instead of conventional fuels to dry products, or using a cheap supplementary supply of solar heat, so reducing conventional fuel demand can result in significant cost savings.

2.1 PROBLEM STATEMENT

Food scientists have found that by reducing the moisture content of food to between 10 and 20%, bacteria, yeast, mold and enzymes are prevented from spoiling it. The flavor and most of the nutritional value is preserved and concentrated. Wherever possible, it is traditional to harvest most grain crops during a dry period or season and simple drying methods such as sun drying are adequate. However, maturity of the crop does not always coincide with a suitably dry period. Furthermore, the introduction of high-yielding varieties, irrigation, and improved farming practices have led to the need for alternative drying practices to cope with the increased production and grain harvested during the wet season as a result of multi-cropping.

Drying and preservation of agricultural products have been one of the oldest uses of solar energy. The traditional method, still widely used throughout the world, is open sun drying where diverse crops, such as fruits, vegetables, cereals, grains, tobacco, etc. are spread on the ground and turned regularly until sufficiently dried so that they can be stored safely. However, there exist many problems associated with open sun drying. It has been seen that open sun drying has the following disadvantages. It requires both large amount of space and long drying time. The Crop is damaged because of the hostile weather conditions, contamination of crops from the foreign materials, degradation by overheating, and the crop is subject to insect infestation, the crop is Susceptible to reabsorption of moisture if it is left on the ground during periods of no sun, and there is no control on the drying process. This could lead to slow drying rate, contamination and poor quality of dried products, and loss in production. Although the spreading of the crop on the ground or on a platform and drying it directly by the sun 1s cheap and successfully employed for many products throughout

the world, where solar radiation and climatic conditions are favorable, because o the above mentioned factors of open sun drying process and a better understanding or the method of utilizing solar energy to advantage, have given rise to a scientific method called solar drying Solar drying of farm crops offers the following advantages by permitting: early harvest which reduces the field loss of products from storm and natural shattering.

The field conditions (dry and fewer weeds) are often better for harvesting earlier in the season, planning the harvesting season to make better use of labor. From crops can be harvested when natural drying conditions are unfavorable, long-time storage with little deterioration. Extended storage periods are becoming increasingly important with large amount of grain being stored and

carried over through another storage year by the farmer, government, and industry, and the farmer's taking advantage of higher price a few months after harvest although in some years there may be no price advantage. By removing moisture, the possibility of the grain heating with subsequent reduction or destruction of germination is decreased.

The farmer's selling a better-quality product which is worth more to him and to those who must use those products. Therefore, by providing a sheltered drying area or chamber in which the crops to be dried and stored, a stream of air is heated by solar energy to reduce its relative humidity which is then passed over the crops. This form of solar drying could improve the quality of the crop to be dried, reduce spoilage by contamination and local overheating, reduce spillage losses, speed up the drying process, achieve better quality control, and reduction in drying time.

The disadvantages of open sun drying need an appropriate technology that can help in improving the quality of the dried products and in reducing the wastage. This led to the application of various types of drying devices like solar dryer, electric dryers, wood fuel driers and oil-burned driers. However, the high cost of oil and electricity and their scarcity in the rural areas of most third world countries have made some o1 these driers very unattractive. Therefore, interest has been focused mainly on the development of solar dryers. Solar dryers are usually classified according to the mode of air flow into natural convection and forced convection natural convection dryers do not require a fan to pump the air through the dryer. The low air flow rate and the long drying time, however, result in low drying capacity. Thus, this is restricted to the processing of small quantities of agricultural surplus for family consumption. Where large quantities of fresh produce are to be processed for the commercial market, forced Convection dryers should be used.

2.2 PROBLEM CONSTRAINTS

Drying processes play an important role in the preservation of agricultural products. They are defined as a process of moisture removal due to simultaneous heat and mass transfer. The purpose of this project is to present the developments and potentials of solar drying technologies or drying grains, fruits, vegetables, spices, medicinal plants. The traditional method of drying. known as sun drying. involves Simply drying the product in the sun on mats, roofs or drying floors Major disadvantage of this method is contamination of the products by dust, birds and insectsSome percentage will usually be lost or damaged, it is labor intensive, nutrients loss, such as vitamin A and the method totally depends on good weather conditions. Because the energy requirements sun and wind - are readily available in the ambient environment, little capital is required. This type of drying is frequently the only commercially used and viable methods in which to dry agricultural products in developing countries. The safer alternative to open sun drying is solar dryer. This is a

more efficient method of drying that produces better quality products, but it also requires initial investments. If drying conditions such as weather and food supply are good, natural circulation solar energy, solar dryers appear to be increasingly attractive as commercial proposition.

To study and Develop a solar dryer in which the grains are dried simultaneouslyby the heated air from the solar air heater. The problem of low, medium & large scale processor could be alleviated, if the solar dryer is designed and constructed with the consideration of overcoming the limitation of direct & indirect type of solar dryer.so therefore, this work will be based on importance of a solar dryer which is reliable and economically, design and construct a solar dryer using locally available materials and to evaluate the performance of this solar dryer.

Why this technology is required?

- To eliminate the unwanted and unpredictable food spoilage of the agro products.
- To study the characteristics and performance of the solar dryer system with continuous feeding & outlet mechanism.
- To develop a solar dryer system for quality ensured products.
- To Design & Develop low cost & Product based Automated (ArdunioControlled) Solar Cabinet Dryer for the welfare of Farmers & Food Processing Industries.
- To achieve favorable temperature for various agro-products with different wetness with the help of effective Solar Tracking system.

2.3 FINAL PROBLEM STATEMENT:

To study and develop a solar dryer in which the grains are dried continuously bycirculating heated air from the solar air heater with the help of manual solar tracking system. The problem of low, medium & large scale processor could be alleviated, if the solar dryer is designed and constructed with the consideration of overcoming the limitation of direct & indirect type of solar dryer. So therefore, this work will be based on importance of a solar dryer which is reliable and economically viable, adoptive design. The controlled drying of the various agro products with the help of the Arduniocontrolled parameters. The project will help the farmers to enhance their economy and drying problems of various agro products.

2.4 PRIORITY NEEDS:

The prime priority to the farmer for drying of grains, as they will receive benefit of this.

The Second Priority To Food Processing Industries To Increases The Food Quality.

2.5 PROPOSED APPROACH/TECHNICAL INTERVENTION/CUSTOMIZATION:

- Visited to farm and had conversation with farmers aboutwhat problems they are facing.
- And we pointed to main problem which they were facing that was drying of grains.
- We can to know about how farmers dry they grains. They use to dry the grains on road side.
- And then we listed the problems which they were facing Problems like: unpredictable food spoilage, more time consumption&unwanted thing mixing with grains.

Brief Methodology of the SEG Project

Components and Materials:

1) Fiber Glass
2) Spiral Rolling Conveyor
3) Solar air Collector
4) Exhaust Fan
5) Ardunio UNO
6) Temperature Sensor (DHT 11)
7) Motor Driver
8) IR Sensor
9) Solar Panel
10) DC Motor
11) Solar Tracking System
12) Breadboard
13) Switchs
14) Buzzer
15) LCD display

1) FIBER GLASS :-

Fiber glass is a type of fiber reinforced plastic where the reinforcement fiber is specifically glass fiber. The glass fiber may be randomly arranged but is commonly woven into a mat. The plastic matrix may be a thermosetting plastic is most often epoxy, polyester resin or vinylester or a thermoplastic.

Why we commonly use glass fiber in Thermal Insulation?

Glass fiber are useful Thermal Insulators because of their high ratio of surface area to weight. However, the increased surface area makes them much more susceptible to chemical attack. By trapping air within them, blocks of glass fiber make good thermal insulation, with a thermal conductivity of the order of 0.05 W/(m.k).

2) SPIRAL ROLLING CONVEYOR :-

Fig 4.1 Fiber Glass

Spiral Rolling Conveyors offers a complete range of elevators for all types of products and applications.Spiral belt conveyor is a compact and high through put solution for up or down elevation. It is known for its simplicity. No controls are needed. The spiral belt conveyor provides a continuous product flow and it is simple and reliable as a normal straight conveyor. The compact spiral-shaped track is the key to its unique compact construction that saves valuable floor space.

The application range is wide, from the handling of individual parcels or totes to handling of packed items such as shrink-wrapped bottle packs or cartons or the handling of single mass flow items such as bottles and cans. The spiral belt conveyor is applied in filling and packing lines, airports, post automation and warehousing. Spiral belt conveyors providing continuous, smooth

vertical transfer of product (in either direction) from upper and lower levels. The spiral conveyors offers an extremely small footprint compared to a conventional Belt Conveyors.

Fig 4.2 Spiral rolling conveyor

3) SOLAR AIR COLLECTOR :-

Solar air heating is a solar thermal technology in which the energy from the sun, insolation, is captured by an absorbing medium and used to heat air. Solar air heating is a renewable energy heating technology used to heat or condition air for buildings or process heat applications. It is typically the most cost-effective out of all the solar technologies, especially in commercial and industrial applications, and it addresses the largest usage of building energy in heating climates, which is space heating and industrial process heating.

Fig 4.3 Solar Air collector

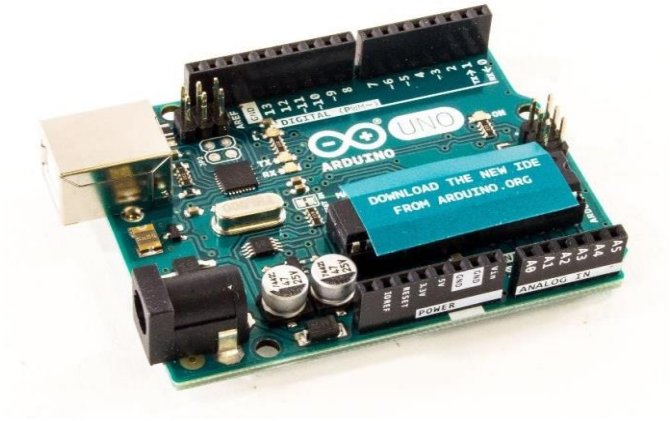
4) EXHAUST FANS :-

Fan is a machine used to create flow within a fluid, typically a gas such as air. The fan consists of a rotating arrangement of vanes or blades which act on the fluid. The rotating assembly of blades and hub is known as an impeller, a rotor, or a runner. Usually, it is contained within some form of housing or case. This may direct the airflow or increase safety by preventing objects from contacting the fan blades. Most fans are powered by electric motors, but other sources of power may be used, including hydraulic motors hand cranks and internal combustion engines. Fans produce flows with high volume and low pressure as opposed to compressors which produce high pressures at a comparatively low volume. A fan blade will often rotate when exposed to a fluid stream, and devices that take advantage of this, such as anemometers and wind turbines, often have designs similar to that of a fan.

Fig 4.4 Exhaust fan

5) ARDUNIO UNO :-

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.



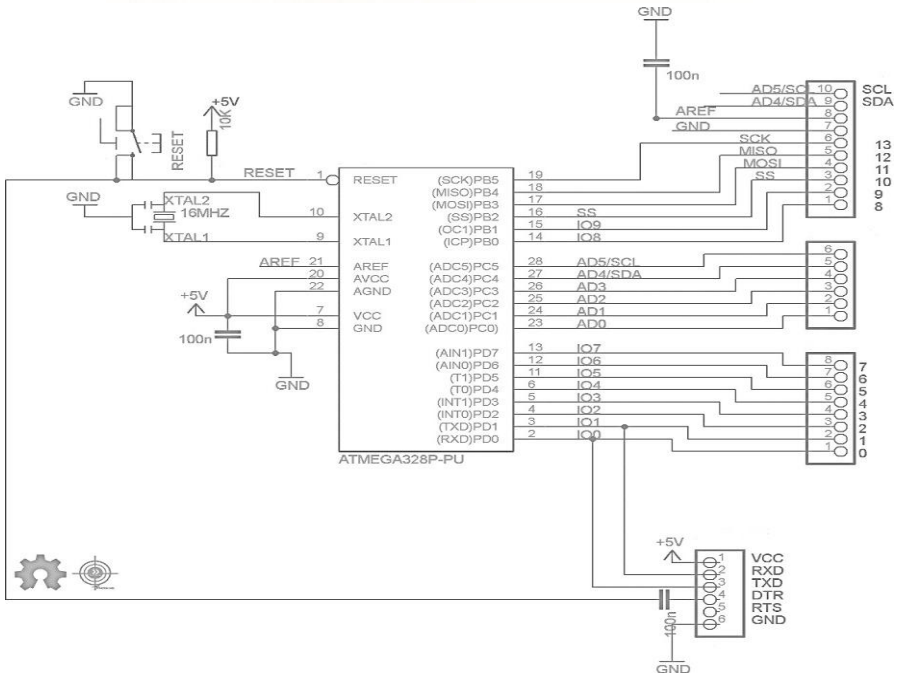


Fig 4.5 Auirdino Circuit Diagram

6) TEMPERATURE SENSOR (DHT 11) :-

The DHT11 is a commonly used Temperature and humidity sensor. The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers. s you can see the data pin is connected to an I/O pin of the MCU and a 5K pull-up resistor is used. This data pin outputs the value of both temperature and humidity as serial data. If you are trying to interface DHT11 with Arduino then there are ready-made libraries for it which will give you a quick start. If you are trying to interface it with some other MCU then the datasheet given below will come in handy. The output given out by the data pin will be in the order of 8bit humidity integer data + 8bit the Humidity decimal data +8 bit temperature integer data + 8bit fractional temperature data +8 bit parity bit. To request the DHT11 module to send these data the I/O pin has to be momentarily made low and then held high as shown in the timing diagram below.

DHT11 Specifications:

- Operating Voltage: 3.5V to 5.5V
- Operating current: 0.3mA (measuring) 60uA (standby)
- Temperature Range: 0°C to 60°C
- Humidity Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit
- Accuracy: ±1°C and ±1%

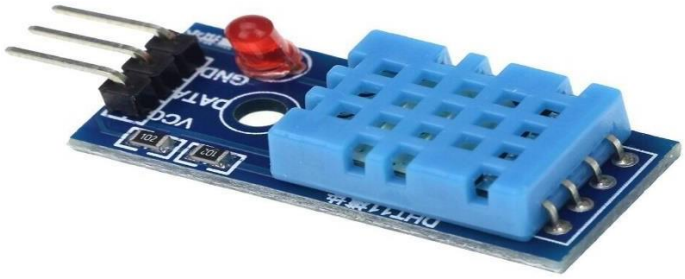


Fig 4.6 Temperature Sensor (DHT 11)

7) MOTOR DRIVER :- This L298N Motor Driver Module is a high power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC motors, or 2 DC motors with directional and speed control. The L298N Motor Driver module consists of an L298 Motor Driver IC, 78M05 Voltage Regulator, resistors, capacitor, Power LED, 5V jumper in an integrated circuit. 78M05 Voltage regulator will be enabled only when the jumper is placed. When the power supply is less than or equal to 12V, then the internal circuitry will be powered by the voltage regulator and the 5V pin can be used as an output pin to power the microcontroller. The jumper should not be placed when the power supply is greater than 12V and separate 5V should be given through 5V terminal to power the internal circuitry. ENA & ENB pins are speed control pins for Motor A and Motor B while IN1& IN2 and IN3 & IN4 are direction control pins for Motor A and Motor B.

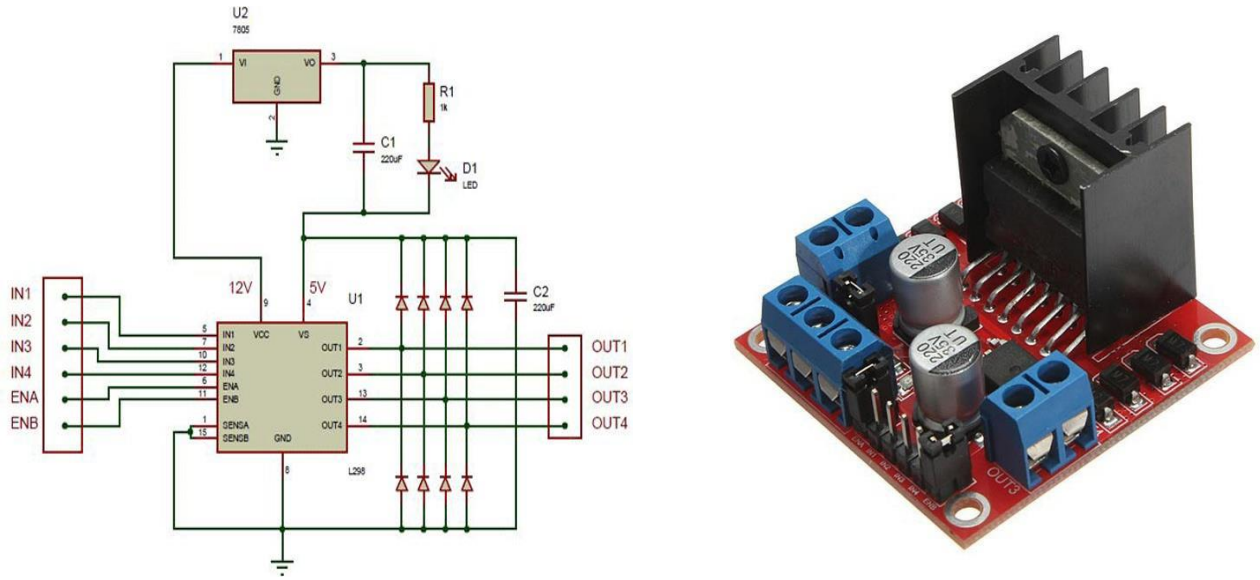
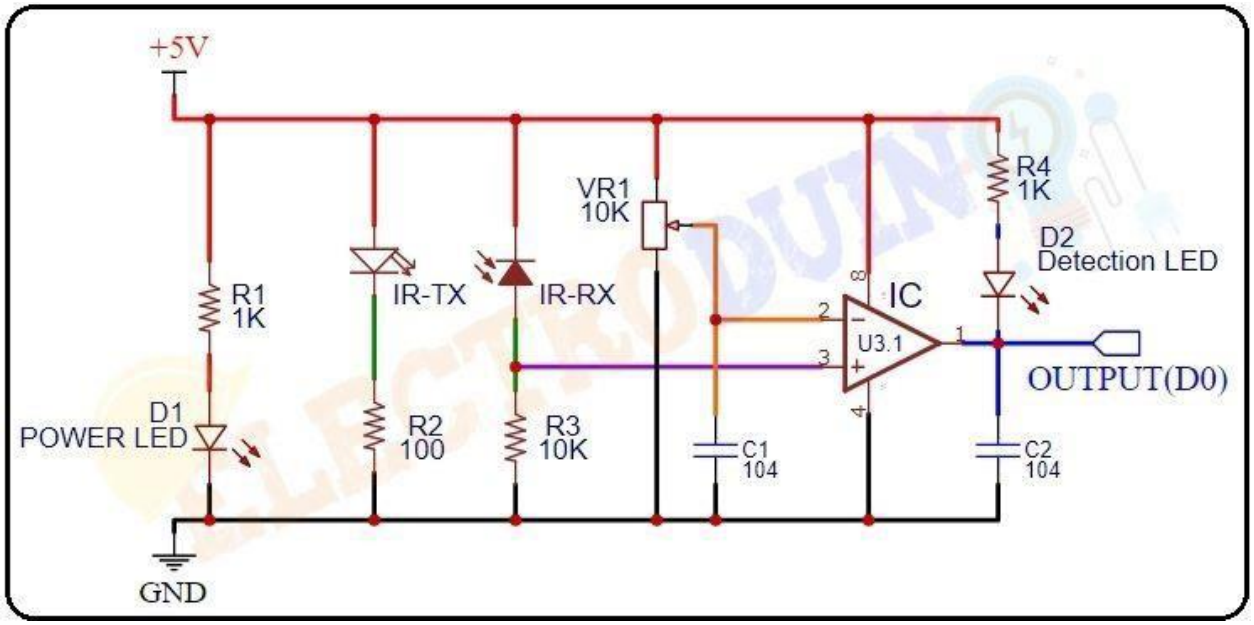


Fig 4.7 Internal circuit diagram of L298N Motor Driver module

8) IR SENSOR :-

The IR Sensor Module or infrared (IR) sensor is a basic and most popular sensor in electronics. It is used in wireless technology like remote controlling functions and detection of surrounding objects/ obstacles. IR sensors mainly consist of an Infrared(IR) LED and a Photodiode, this pair is generally called IR pair. An IR LED is a special purpose LED, it is can emitting infrared rays ranging from 700 nm to 1 mm wavelength. These types of rays are invisible to our eyes. In contrast, a photodiode or IR Receiver LED detects the infrared rays.



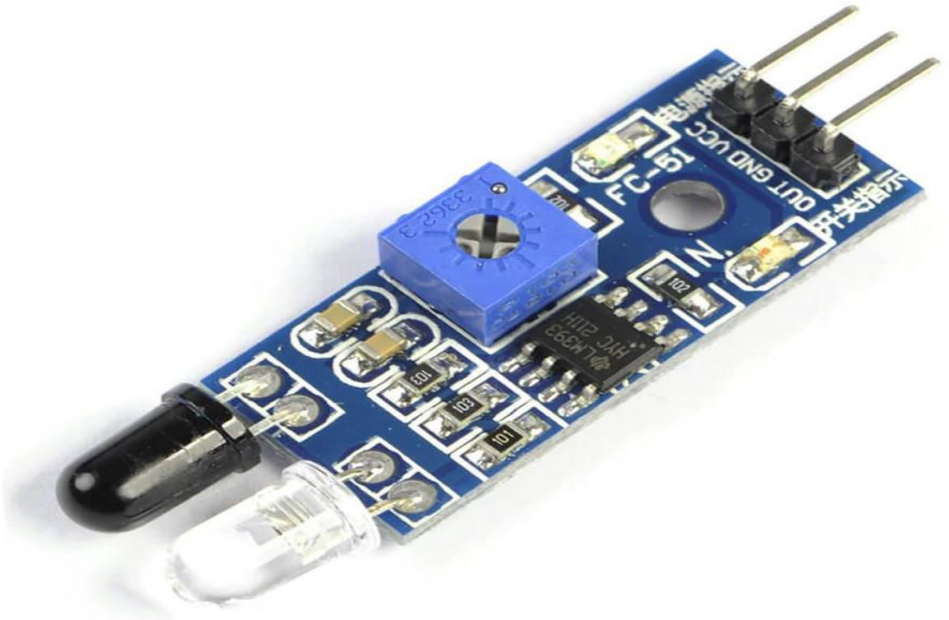


Fig 4.8 Circuit Diagram of IR Sensor Module

9) SOLAR PANEL :-

The main components of a solar power system are photovoltaic (PV) panels, a DC to AC power converter (called an inverter) and a rack system that holds the PV panels in place .This conversion takes place within the cells of solar panels which are specially fabricated, usually of silicon.

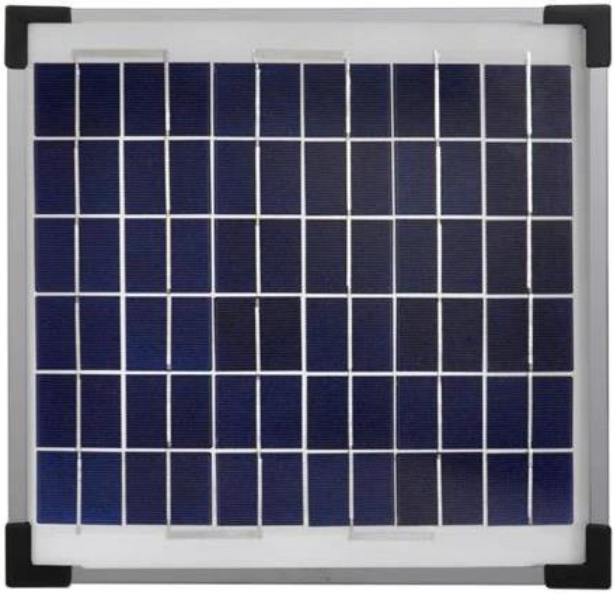


Fig 4.9 Solar Panel

10) DC MOTOR :-

A gear motor is an electric motor and a power reducer combined into a single unit that reduces the number of revolutions but increases the torque of the operating shaft. Such gears for electric motors are often used in modern machines and mechanisms, it is universal for many types of equipment. Some hybrid models combine practicality and durability. The housing is made of plastic and the gears are made of metal. This design gives a minimum noise level during the operation of the devices, the voltage can be from 12 to 24 V.

Fig 4.10 Gear Motor

11) LCD DISPLAY :-

The most basic LCD introduced above is called passive matrix LCDs which can be found mostly in low end or simple applications like, calculators, utility meters, early time digital watches, alarm clocks etc. Passive matrix LCDs have a lot of limitations, like the narrow viewing angle, slow response speed, dim, but it is great for power consumption. In order to improve upon the drawbacks, scientists and engineers developed active matrix LCD technology. The most widely used is TFT (Thin Film Transistor) LCD technology. Based on TFT LCD, even more modern LCD technologies are developed. The best known is IPS (In Plane Switching) LCD. It has super wide viewing angle, superior image picture quality, fast response, great contrast, less burn-in defects etc. IPS LCDs are widely used in LCD monitors, LCD TVs, Iphone, pads etc. Samsung even revolutionized the LED backlighting to be QLED (quantum dot) to switch off LEDs wherever light is not needed to produce deeper blacks.

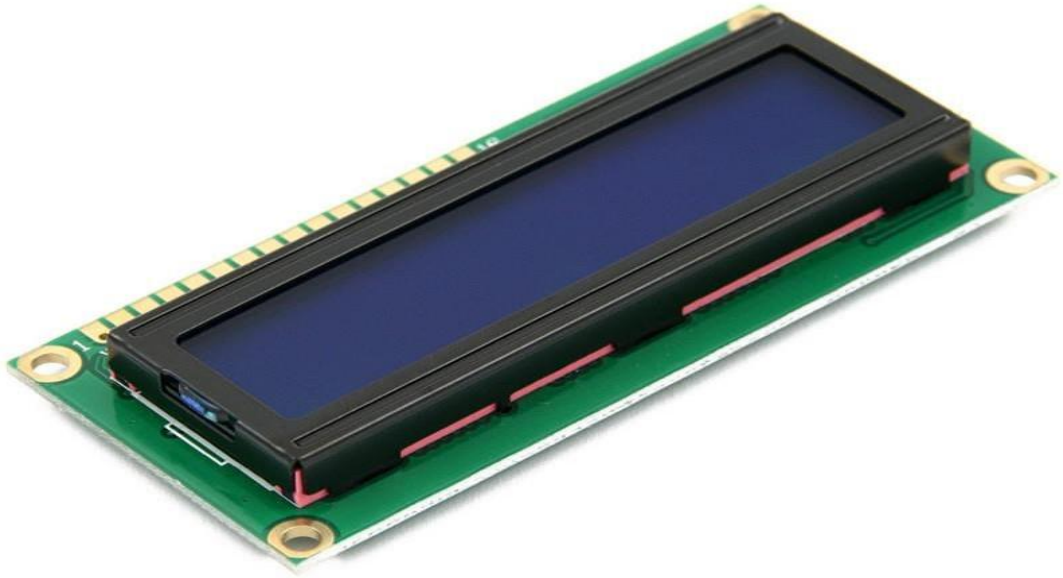


Fig 4.11 LCD Display

12) BREADBOARD :-

A Breadboard is simply a board for prototyping or building circuits on. It allows you to place components and connections on the board to make circuits without soldering. The holes in the breadboard take care of your connections by physically holding onto parts or wires where you put them and electrically connecting them inside the board. The ease of use and speed are great for learning and quick prototyping of simple circuits. More complex circuits and high frequency circuits are less suited to breadboarding. Breadboard circuits are also not ideal for long term use like circuits built on perfboard (protoboard) or PCB (printed circuit board), but they also don't have the soldering (protoboard), or design and manufacturing costs (PCBs).

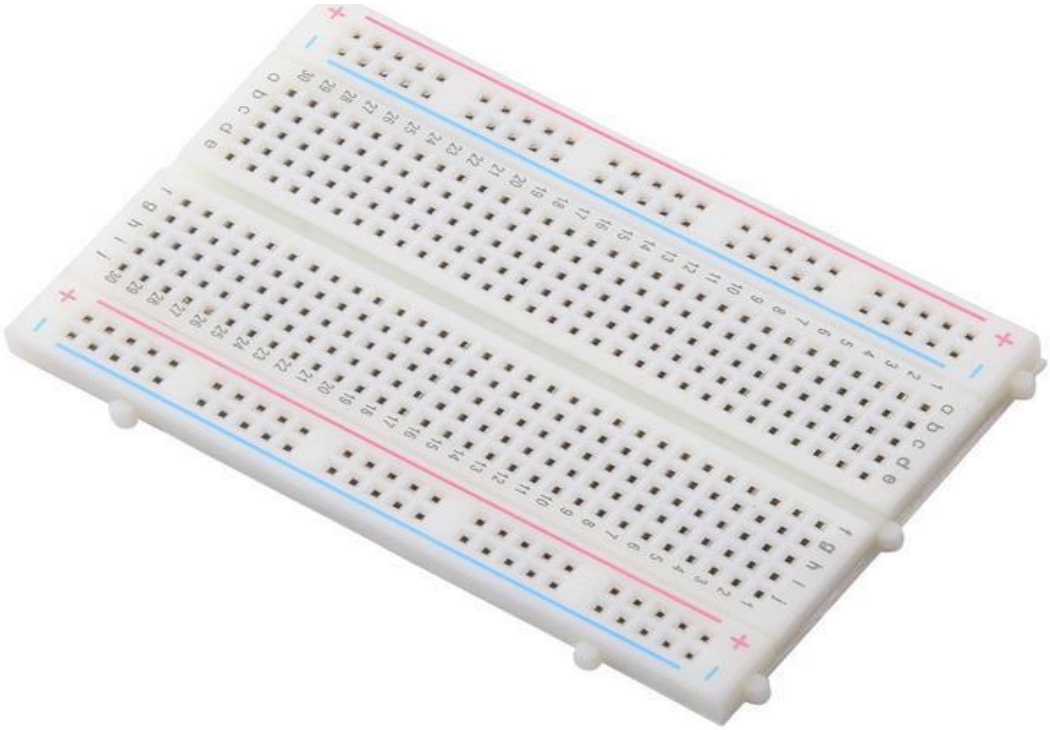


Fig 4.12 Breadboard

4.2 MATERIALS USED

a) Glass thickness 4mm

b) Mild Steel Angle

c) PVC pipe

d) Glue gun

e) Sealant

f) Aluminum Sheet

g) High quality plywood

h) Black paint

i) Nails

1) GLASS: -

Glass is one of three basic types of ceramics; Glass is distinguished by its amorphous (non-crystalline) structure solid material that exhibits a glass transition. Glasses are typically brittle and can be optically transparent. Molecules that link up with each other to form long chains and network. Hot glass cools, chains unable to organize into a pattern. Solidification has short-range order only. Amorphous structure occurs by adding impurities (Na, Mg, Ca, and Al3). Impurities: interfere with formation of crystalline structure.

2) ALUMINUM: -

Crystal Structure

When metals change from the molten to the sold state, they assume crystalline structures. The atoms arrange themselves in definite ordered symmetrical patterns which metallurgists speak of as "lattice" structures. Aluminum, like copper, silver and gold, crystallizes with the face-centered-cubic arrangement or atoms, common to most of the ductile metals. This means that the atoms form the comers of a cube, with one atom in the centre of each face. The length of the sides of the cube for high purity aluminum has been determined as 4.049 x 10-8 cm, the shortest distance between two atoms in the aluminum structure is 2 divided by x 4.049. The face centered cubic structure is one of the arrangements assumed by close packed spheres, in this case with a diameter of 4.049 x 10-8 cm, the corners of the cube being at the centre of each sphere.

Thermal Conductivity

The thermal conductivity, K, of 99.99% pure aluminum is 244 W/mK for the temperature range 0-1000 C which is 61 9% of the IACS, and again be-cause of its low specific gravity mass thermal conductivity 1s twice that of copper. The combined properties of high thermal conductivity, low weight and good formability make aluminum an obvious choice for use heat exchangers, car radiators and cooking utensils while in the cast form it is extensively used for I/C engine cylinder heads.

Reflectance and Emissivity

Emissivity, the ease with which a substance radiates its own thermal energy, is closely allied to reflectivity, the best reflecting surface being the poorest emitter, and conversely the worst reflecting surface being the best emitter. Plain aluminum reflects about 75% of the light and 90% of the heat radiation that falls on it. The emissivity of the same piece of aluminum 15, however, low (< 10% of that of a black body at the same temperature and with the same surroundings). The combined properties of high reflectivity and low emissivity give rise to the use of aluminum foil as a reflective insulating medium, either in dead air spaces or as a surface laminate combined with other insulating materials where it can also be arranged to pro-vide the added benefit of an effective vapor barrier.

4.3 NON-TECHNICAL ASPECTS :-

A huge advantage of solar dryers is the fact that different types of fruits and vegetables can be dried. The quality of products dried in this way is excel-lent, due to the fact that the food not in direct sunlight (cabinet or in-house dryer), and due to a shorter drying process-up to a 1/3 of the time in comparison to traditional sun drying.

The drying operation must not be considered as merely the removal of moisture since there are many quality factors that can be adversely affected by incorrect selection of drying conditions an equipment. The desirable properties of high-quality, e.g. for grains, include

- Low and uniform moisture content.
- Minimal proportion of broken and damaged grains
- Low susceptibility to subsequent breakage.
- High viability.
- Low mould counts.
- High nutritive value.
- Consumer acceptability of appearance and organoleptic properties

Even where there 1S a demand for loss reducing technical changes, farmers may find it difficult to adopt recommended technologies because of cash flow problems, labor constraints, or lack of materials. Small farmers and traders often find it difficult to obtain credit at reasonable interest rates, since formal financial institutions consider loans to them be too risky.

1. DRYING BEHAVIOR

Apart from weather conditions the drying behavior of agricultural crops during dying depends on the,

- Product
- Size and shape
- Initial moisture content
- Final moisture content
- Bulk density
- Thickness of the layer
- Mechanical or chemical pre-treatment
- Turning intervals
- Temperature of grain
- Temperature, humidity of air in contact with the grain

• Velocity of air in contact with the grain

2. WEATHER CONDITIONS

The performance of solar dryers is significantly dependent on the weather conditions. Both the heat required for removing the moisture as well as the electricity necessary for driving the fans are generated in the most cases by solar energy only. In addition to the pre-treatment of the product, the weather conditions have the biggest influence on the capacity of product that can be dried within a certain time period.

The drying time is short under sunny conditions and accordingly ex-tended during adverse weather conditions. The difference in drying capacity between dry and rainy season has to be taken into consideration for the calculation of the yearly capacity of the dryer.

The utilization of solar energy as the only energy source is recommended for small-scale dryers where the risk of spoilage of big quantities of crops due to bad weather is low. If largescale solar dryers are used for commercial purposes it is strongly recommended to equip the dryer with a back-up heater to bridge periods with bad weather.

3. STORAGE

For small farmers the man purpose in storing grains is purpose in storing grains is to ensure house-hold food supplies. Farm storage also provides a form of saving, to cover future cash need for barter exchange or gift-giving. Grain is also stored for seed and as inputs into house hold enterprises such as beer brewing, or the preparation of cooked food.

There is ongoing debate about whether farmers are forced to sell because of debt a economic dependence on others, or whether they sell because they regard storage as

• Too costly (in terms of time), or

• Too risky (given the risk of losses and unpredictability of future prices), or

• Unprofitable in relation to other investments such as cattie

There is no single answer to the debate, since there is much variation in the circumstances under which individual famers operate, both within and be-tween nations.

4. CAPACITY

The capacity of a solar dryer mainly depends on the crop itself and the shape. On the one hand, it should not be too big to ensure that the preparation (washing, slicing and pre-drying processing) of the product to be dried can be completed within a certain time period. On the other hand it should be big enough to enable the user to generate income and thus to create new jobs.

5. SELECTION, CLEANING AND PRE-TREATMENT

A process similar to the following seven steps is usually used when drying fruits and vegetables (and fish, with some medic fictions)

1. Selection (fresh, undamaged produce)
2. Cleaning (washing & disinfection)
3. Preparation (peeling. slicing. etc.)
4. Pre-treatment (e. g sulfurizing, blanching, salting)
5. Drying
6. Packaging
7. Storage or sale

Only fresh , undamaged food should be selected for drying to reduce the chances of Spoilage and to help to ensure a quality product After selection, it is important to clean the Produce This is because drying does not al-ways destroy micro-organisms, but only inhibits there growth Fruits, vegetables, and meats generally require a pre-treatment before drying. The quality of dried fruits and vegetables is generally improved with one or more of the following Pre treatments: anti-discoloration by coating with vitamin C, de-waxing by briefly boiling and quenching, and sulfurization by soaking or fumigating. Fish is often salted. A small amount of chemical will treat a large amount of produce, and thus the cost for these supplies is usually small. However, potential problems with availability and the complexity of the process should be Considered. After selection, cleaning, and pre- treatment, produce is ready to place in the dryer trays. Solar dryers are usually designed to dry a batch every three to five days. Fast drying minimizes the chances of food spoilage. However, excessively fast drying can result in the formation of a hard, dry skin a problem known as case hardening. Case hardened foods appear dry outside, but inside remain moist and susceptible to spoiling. It is also important not to exceed the maximum temperature recommended, which ranges from 35 to 45°Cdepending upon the produce. Learning to properly solar dry foods in a specific location usually requires experimentation. For strict quality control, the drying rate may be monitored and correlated to the food moisture con tent to help determine the proper drying parameters.

After drying is complete, the dried produce often requires packaging to prevent insect losses and to avoid re-gaining moisture. It should cool first, and then be packaged in sanitary condition. Sufficient drying and airtight storage will keep produce fresh for six to twelvemonths. It possible, the packaged product should be stored in a dry, dark location until use produce is to be exported, it must meet the quality standards of the target county. In some cases this will require a chemical and

microbiological analysis of dried samples in a laboratory. Food drying requires significant labor for pre-treatment (except for grains), and minimal involvement during the drying process such as shifting food to insure even drying Solar drying equipment generally requires some maintenance.

WORKING:

- The solar cabinet dryer is based on greenhouse effect where the solar heat is trapped inside the drying chamber and thus increases the temperature level.
- The direct solar energy collected in the chamber, heat up the food product and remove moisture.
- The indirect heat energy collected in the solar collector heats up the air in the chamber, hence air circulation continuously increases the temperature in the cabinet.
- This method of continuous air circulation increases the trapped air temperature which in turn increases its efficiency.
- As the system involve both natural and forced convection, hence called mix mod.
- When the solar cabinet with all the system attached to give maximum results.
- We Placed the Exhaust fan in reverse order to pass the air for outside to inside the solar air collector.
- This heated air is forced into the chamber using the fans at the inlet and outlet of solar air collector.
- In the chamber we placed Spiral Rolling Conveyor to dry the grain and it is the continous feeding and outlet Mechanism.
- These Exhaust fan movement is controlled at the Particular RPM by the ARDUNIO system which can be controlled the inner Temperature of the chamber.
- The tempeature Sensor(DHT11) is the sensor to which helps to know the temperature & Humadity inside the chamber with the help of LCD Display.
- We have Programmed for ARDUNIO UNO to Control 5 operations
    - To Control the RPM of Exhaust Fans.
    - To Maintain the temperature inside the chamber by using DHT11 temperature Sensor & the temperature is already Pre-decided & value are Coded in Program.
    - We have connected LCD screen to Arduino board to display the Present Temperature & Humadity Inside the chamber.
    - And also Solar Tracking system is connected to Arduino to get Maximum intensity of solar radiations.
    - To maintain the inside temperature of the chamber we have connected the low RPM exhaust fan.

CALCULATIONS:

1) Mass of water to be evaporated

$$Me = (mi-mf)\ Mp \qquad (1)$$
$$100 - mf$$

Where, mi= initial water content of product [%] wet basis

mf= desired final water content of product [%] wet basis Me=

mass of water to be extracted from the product [kg]

Mp= mass of product to be dried (after preparation) or

initial feed mass [kg] (1-5 kg assumed as capacity of drying chamber)

- Moisture content in product which is to be feed in dryer (mi) Initial moisture content assumed :- 85%

- Moisture content in product which is to be achieved in the product as output (mf) Final moisture content to be achieved :- 15 to 20 %

➢ Therefore, Me= 4.1 Kg

2) Energy required for evaporating water from product,

$$Ep=Me*Lv\ldots \qquad (2)$$

where, Lv = latent heat of vaporization of =2260KJ/kg

Therefore , Ep= 9266 KJ/kg

- Energy required evaporating = Energy gain by air x time

$$Ep=Ea*ts \qquad (3)$$

- Energy gain by air from Radiation,

$$Ea=Ic*Ac*(\text{Efficiency Of collector}) \qquad (4)$$

Where, Ic= Solar intensity (W/m2)=450 w/m2

(average assumed)

Ac= collector area (m2)

Efficiency of collector assumed=(maximum) 40%,

because as any collector acts like heat transfer exchanger so assumed it is 40% rather than 50% maximum

- Therefore Ac can be known from equation 2, 3 &4,

➢ Ac= 1.7 m2 = 1.497m x 1.1m(approx)

- Heat gain by air,

Ea=Ic*Ac*(Efficiency Of collector)=Ma*Cpa*ΔT

Where, (Cpa) air = 1.006 kJ/kgK

ΔT=45-27= 18 degree Celsius(◦C)=291 Kelvin(K)

So, Ma= mass flow rate of air=1.04 (Kg/s) is obtained from above calculations

• Now, Mdr= Me/ts =4.1/12=0.641

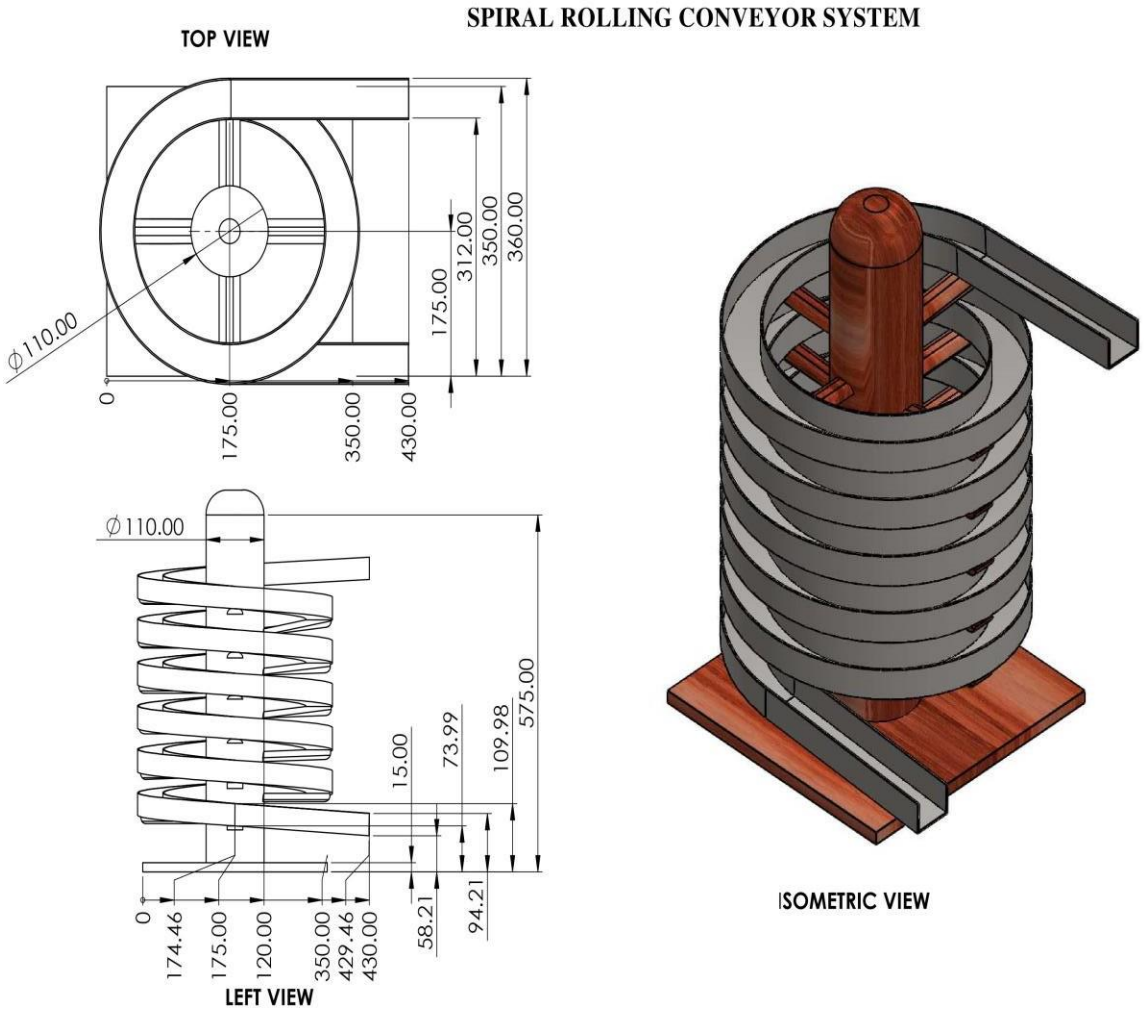
Mdr= 0.641 (kg/hr)

Where, Mdr = average drying rate (Kg/hr)

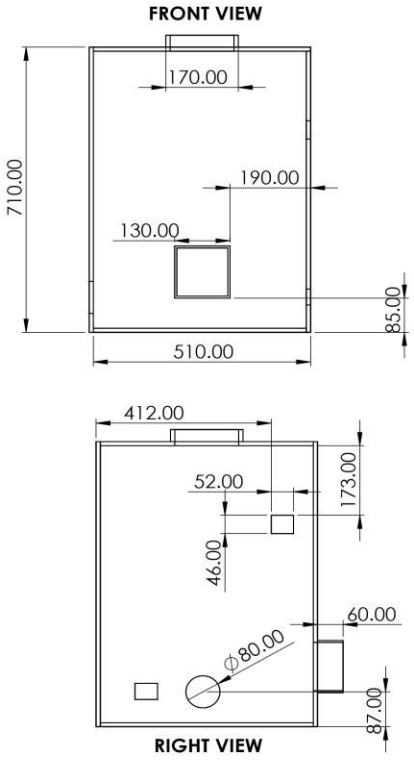
Me= mass of water to be extracted from the product[kg]

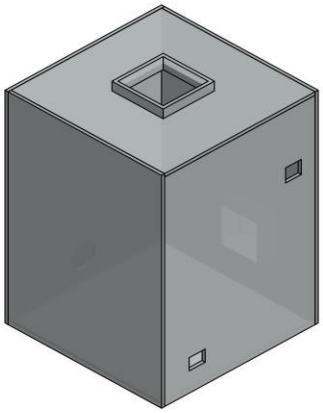
ts= time required for drying.

5.2) DESIGN



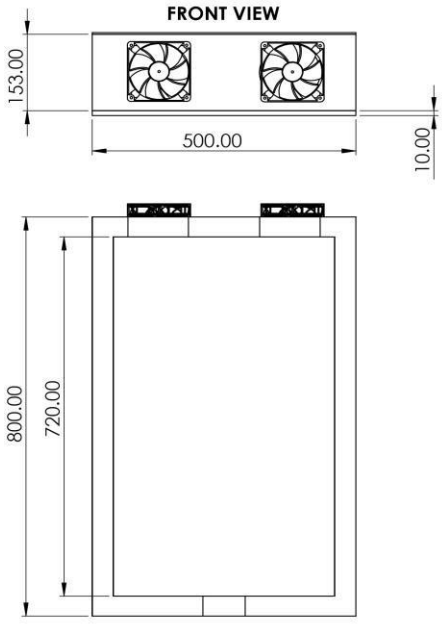
SOLAR CABINET





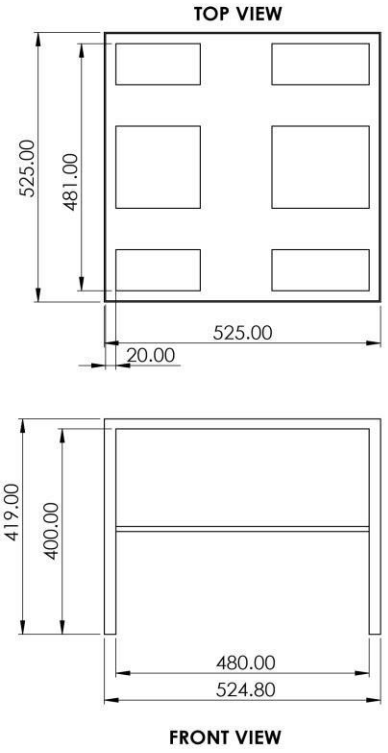
ISOMETRIC VIEW

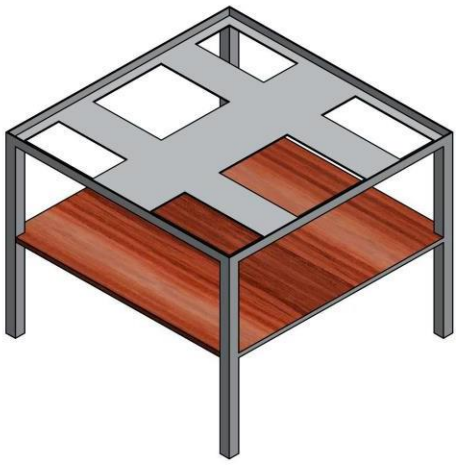
SOLAR AIR COLLECTOR



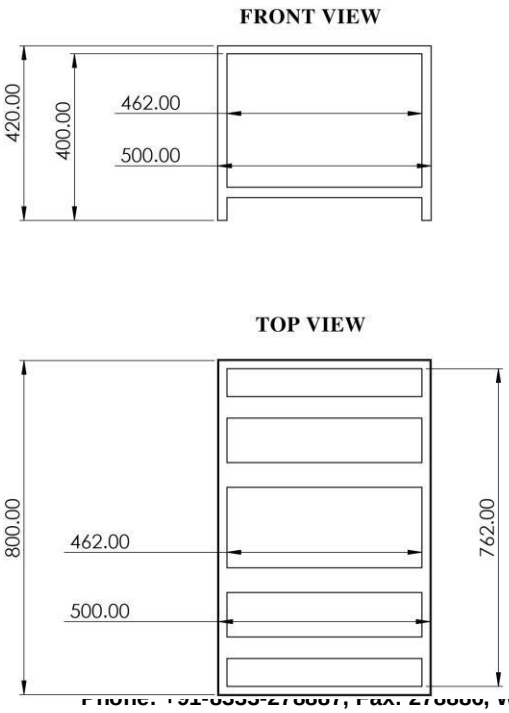
ISOMETRIC VIEW

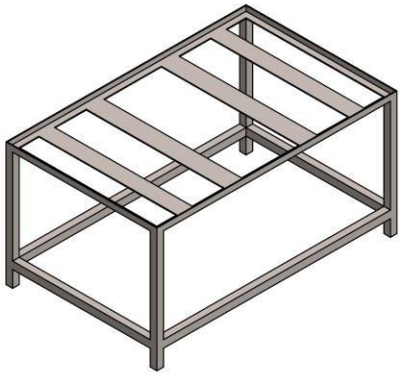
SOLAR CABINET STAND





SOLAR COLLECTOR STAND





FABRICATION

ADVANTAGES OF THE PROJECT

ADVANTAGES

- Drying is faster, As the temperature inside the dryer is higher than outside.
- Less risk of spoilage because of no external air is in contact with the product.
- It reduces losses and Quality ensured Products.
- The product can be stored in the cabinet itself, if storage space is inadequate.
- Increases the farmer income by quality product.
- It doesn't require much of Mantianence.
- It is fully Eco-Friendly.

FUTURE SCOPE

- The capacity and efficiency of the can be increased by increasing the cabinet holding capacity and increasing the solar absorption area.
- Solar tracking system can be replaced by dual axis solar tracking system so that it can absorb more sun radiation.
- The cabinet can be replaced with 200micron UV protected fiber glass sheet for holding larger product and higher drying area.

Role of Principal Investigator and the beneficiaries (ST, SC, OBC, Tribal etc.) and potential impact of technology on the beneficiary and village

The role of PI is to identify the needs of the village people by carrying out the survey in adopted villages. Based on the need analysis of village people, technically feasible and economically viable system design is proposed for technological development and implementation through procurement of materials and accessories. After designing, testing of the proposed system is done.

For smooth and safe operation of the system, necessary awareness with all information related to the project is provided to the beneficiary.

1. Design and Development Stage: Suitable Human resource mobilization and laboratory supports
2. Implementation Stage: Coordination between Gram Panchayat& SEG Members
3. Outcome Analysis Stage: Suitable human resource mobilization

Farmers having less farming land. The socio economic development of village farmers.

Role of PI after completion of the project duration:

1) Scaling of the project to reach all need people of the adopted villages
2) Preparing DPR to the district level
3) Automation for feeding and outlet mechanism to increase productivity
4) Steps to increase the performance and efficiency of the project
5) Design and development towards increasing the quality of the agro products for exporting.
6) Steps towards to add relevant values to the agro products.

Execution of the project along with role of all participating stakeholders

i) Problem Statement:

To study and develop a solar dryer in which the grains are dried continuously by circulating heated air from the solar air heater with the help of manual solar tracking system. The problem of low, medium & large scale processor could be alleviated, if the solar dryer is designed and constructed with the consideration of overcoming the limitation of direct & indirect type of solar dryer. So therefore, this work will be based on importance of a solar dryer which is reliable and economically viable, adoptive design. The controlled drying of the various agro products with the help of the Ardunio controlled parameters. The project will help the farmers to enhance their economy and drying problems of various agro products.

ii) Priority Needs:

1. The prime priority to the farmer for drying of grains, as they will receive benefit of this.
2. The Second Priority To Food Processing Industries To Increases The Food Quality.

ii) Proposed approach/Technical Intervention/customization:

- Visited to farm and had conversation with farmers about what problems they are facing.
- And we pointed to main problem which they were facing that was drying of grains.
- We can to know about how farmers dry they grains. They use to dry the grains on road side.
- And then we listed the problems which they were facing Problems like: unpredictable food spoilage, more time consumption & unwanted thing mixing with grains.

Impact of this work on learning of students/ teachers:

Resolving the farmers' problems related to their agro products. Using of advanced technology to enhance the value of the agro products. Technology intervention in the agriculture.

CONCLUSIONS AND OUTCOMES

The solar dryer can raise the ambient air temperature to a considerable high value for increasing drying rate of agricultural crops.

- The product inside the dryer requires less attentions, like attack of the product by rain or pest (both human and animals), compared with those in the open sun drying it can be used to dry other crops like yams, cassava, maize, potato and plantain etc.
- There is easy in monitoring when compared to the natural sun drying technique.
- The capital cost involved in the construction of a solar dryer much lower to that of a mechanical dryer.
- The dryer exhibited sufficient ability to dry food items reasonably rapidly to a safe moisture level and simultaneously it ensures superior quality of the dried product cabinet and air- heater are much higher than the ambient temperature.
- The solar dryer can raise the ambient air temperature to a considerable high value for increasing c drying rate of agricultural crops. The product inside the dryer requires less attentions, like attack of the product by rain or pest (both human and animals), compared with those in the open sun drying.

Outcomes of the Project:

The outcomes of our project are as below:

- Ardunio Controlled agro-product based drying.
- Affordable Cost agro-product Solar based Dryer.
- Increased farmer income by quality product.
- Automated & Product based controlled Drying.
- Quality ensured Products Portable & Movable Farmer Friendly Dryer.

28/12/23

Dr.S.N.Topannavar
Principal Investigator: SEG Project &
UBA-1.0 & 2.0 Program Coordinator

28/12/23

Dr.S.C.Kamate
Principal

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Photo Gallery


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ನಿಡಸೋಶಿ.
"UNNAT BHARAT ABHIYAN"
"ಉನ್ನತ ಭಾರತ ಅಭಿಯಾನ"
DRINKING WATER


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"UNNAT BHARAT ABHIYAN"

Village and Household Survey of AMMANAGI

Village and Household Survey of NIDASOSHI

Village and Household Survey of BORGAL

Village and Household Survey of HATTARWAT

Village and Household Survey of KESTI


64MP AI QUAD CAMERA
Shot by caj


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