# RURAL TECHNOLOGY

ISSN 0970-3527

June'94

# JOURNAL

Volume 11
Number 1
June 94



# CONTENTS



**Cover Designed by** : T. Zaidi
**Published by** : Information Service Division, C. D. R. T., I. E. R. T., Allahabad.
**Partially Supported by** : Deptt. of Science & Technology, Government of India

# Editorial

It is heartening to observe that incidences of people's initiatives, in the murk world of socio-political mess that we witness today, stand as bright-beacon in the midst of darkness. The field of rural technology is no exception. Our convictions and analysis are getting, scientific confirmation-whether it is abandoning of tractors in Punjab, vermi composting technique in Maharashtra and elsewhere, 2- wheel bicycle trailers finding immediate response in rural Assam, M.P., Bihar etc. (and the list could be very long) all indicate tremendous potential for environment friendly people's technologies and at the same time perils of technologies thrusted upon the people from above. But the tragedy is that these numerous success stories of simple, cost effective and scientifically sound technologies do not get state support for their wide spread proliferation. Even greater tragedy is that they do not find mention, what to say of being discussed, in scientific fora in general. Through these columns we once again appeal to our 'think-tanks'/reservoirs of scientific talents and expecte them to rise to the occassion and save the country from technology dumping via economic liberalisation and reforms. At least these appropriate technologies merit discussion and objective evaluation and wherever they stand superior to imported or the so-called modern technologies, they should be taken up for mass multiplication in an organised manner. Nothing could be more scientific and rational to demand from the community of scientists and technologists and not from the government which is insular to be such ideas due to its own well-known interests. We still hope there will be positive response to our appeal and a country wide awakening will be initiated to develop and multiply people's technologies.

# Publication List 1993

1. Rural technology : Report of National Seminar, 1981, 20 papers on Rural/Appropriate Technology.
   English pp 288 Rs. 200/-
2. Renewable Sources of Energy : Proceedings of Short Term In-Service Training Programme, 1983, 20 papers on solar Cookers Smokeless Cookstoves, Micro Hydro Power, Wind Energy, Biomass and Biogas etc.
   English pp 250 Rs. 200/-
3. Selection of Windmill and Agricultural Pumpsets : Course manual of Training Programme for Senior Officers of NABARD, 1984, 3 papers on Water Pumping Windmills, Special features : Paper on agronomic aspects of Windmill Irrigation.
   English pp 39 Rs. 30/-
4. Course Synopsis of ISTE : Summer School on Renewable Sources of Energy, 1984, 12 Papers on Biomass, Biogas, Wind Energy, Solar Energy and Micro Hydel sets etc. and 4 project reports on Solar Water Heater, Solar Cooker and Biogas plant.
   English pp 165 Rs. 150/-
5. Paper and proceedings of National Workshop on Energy from Agricultural Residues, 1986 : Background paper, recommendations, keynote and valedictory address and 28 papers on the topic.
   English pp 208 Rs. 200/-
6. Paper and proceeding on National Workshop on Decentralised Energy Planning for Rural Development : recommendations, keynote and valedictory address and 12 papers on the topic.
   English pp 200 Rs. 200/-
7. Course synopsis of ISTE : Manual of Training Programme for Junior Engineers of Rajya Krishi Utpadan Mandi Parishad, U.P. 1987, 17 papers on biogas. Agricultural Implements. Windmill, Agriculture marketing, water lifting devices etc.
   English pp 235 Rs. 225/-
8. Course synopsis of ISTE : Manual Training Programme on Renewable Sources of Energy for Project Officers of Non-Conventional Energy Development Agency, Government of Uttar Pradesh, 1987, 13 papers on Biogas, Biomass, Solar energy, Cookstoves, Human and Draught Animal Power, Aero Generators etc.
   English pp 196 Rs. 200/-
9. A case study on Smokeless Cookstove
   English pp 32 Rs. 25/-
10. Report of Sample Survey and Evaluation of the Smokeless Chulha Extension Programme of the Non-Conventional Energy Development Agency U.P., in the District of Varanasi, Faizabad, Nainital and Bijnaur.
    English pp 150 Rs. 200/-

SEND ORDERS TO :

CDRT Information Services
Institute of Engineering and Rural Technology
26, Chatham Lines, ALLAHABAD - 211 002 INDIA.

# INDOOR AIR POLLUTION

## Use of Wood and Coal as Fuel in the Home

*Nguyen Trong Phuong, Engineer*
*Hanoi Architectural Institute, Vietnam*

***Biomass fuels like wood, crop residues, animal dung, grass and other form of biomass are used by approximately half the world population as cooking and/or heating fuels, often in poorly ventilated conditions leading to high exposures to health threatening air pollution. Many ways of reducing indoor air pollution, including the introduction of stoves with hoods and chimneys, altering kitchen ventilation and layout, location of kitchen, fuel substitution and improved combustion efficiency have been discussed in the paper.***

### INTRODUCTION

In Vietnam at present, there is up to 90% of the population still using wood and coal for domestic cooking. In recent years, the use of coal briquettes for domestic cooking in Hanoi increased as the coal of electricity and oil has accelerated. These fuels produce a lot of pollutants during their burning process, thus cooking with these fuels in the kitchen pollute the air inside the whole dwelling. Indoor air popllution has many harmful effects on the people's health.

In order to cope with this situation and to reduce indoor air pollution, we have carried out some preliminary investigations on the effects of pollutants caused by cooking by wood and coal fuel in the dwelling. We have directed our investigations on the effects of cooking fuels, stoves, chimeny and kitchen planning on indoor air pollution. Our investigations have concentrated on the coming points.

- House orientation, ventilation capacity of the dwelling and their effect on indoor air pollution.
- Indoor air pollution relates to the location of the kitchen inside with dwelling, and its relation to other rooms.
- The structures of chimney and chimney hood and their effects on indoor air pollution.
- The use of fuels and stoves in relation to indoor air pollution.

We have carried our measurements in the experimental buliding at the Hanoi Architectural Institute to look for indicators on the types and amount of pollutants caused by cooking with wood and coal as fuels. We also carried out experiments on how the types and structure of the chimney hood affects the level of air pollution in the kitchen and in the dwelling.

These indicators are expected to be used as a base to suggest solution for improving or designing kitchens in which the effects of those pollutants can be reduced.

**Efforts to reduce indoor air pollution from cooking fuels— The relationship between the location of the kitchen, ventilation capacity and the indoor air pollution.**

The kitchen is the producer of the pollutants and smoke from cooking, which are transmitted through the whole dwelling. Our assumption is that the effects of the pollutants can be reduced if the kitchen is located at the end of the wind direction and separated from other rooms. The means to separate the kitchen from other rooms can be a court yard, veranda, or at least by closing the connecting doors to other rooms.

If the connection to other rooms cannot be closed, all the doors and windows should be open to increase natural ventilation and let the pollutants escape.

We have measured the CO conentrations in the kitchen in two cases; when the kitchen is integreated into the living area and when it is separated. Wood fuel and coal fuel respectively are used in these two cases. The measurement are

presented in tables 1 and 2 (on next page.)

The above measurements show that the indoor air pollution is less when the kitchen is seperated and there are many openings for ventilation.

**Chimney and Chimney hood in relation with indoor air pollution.**

Chimney and chimney hood are means to evacuate smoke and pollutants from the burning process. The relationship between height, dimension of the chimney hood and the opening area of the hood affects the amount of the air exhaust. It was observed that when the height and dimension of the chimney remained constant, the changes in the opening area of the hood greatly affect the exhaust capacity of smoke and other pollutants.

For example, when the opening area, the exhaust capcity of smoke and other pollunts increases thus reduces the amount of pollutants indoors. However, the change of the opening area of the hood differs depending on whether, it is created by the changes in horizontal or vertical dimensions. It is observed that the reduction of opening area by decreasing the horizontal dimension has a great effect on increasing smoke and pollutant exhaust capacity than reduction of the opening area of the hood by decreasing the vertical dimension.

The chimney hood of the Reference flat has a chimney of height 1.5 m, dimension of 0.15m. The opening area of the hood is as seen in figure 2. We have carried out tests in which the opening area of the hood is reduced both horizontally, and vertically in respective tests, by closing gradually parts of the opening as described in figure 3. The changes of the CO concentration in the kitchen and in the bedroom are recorded in table 3.

**Table 1 : Comparison of CO pollution level in the kitchen and bedroom. In these 2 kitchens, the smoke is exhausted through cooking windows. The doors are closed.**

| Type of Fuel | Location of the Kitchen | The CO Concentration (PPm) | | |
|---|---|---|---|---|
| | | in the Kitchen | in the bedroom | outside |
| Coal Briquette | in the flat | 5 | 4 | 1 |
| | outside, separated by corridor or Courtyard | 5 | 2 | 2 |
| Wood | in the flat | 18 | 16 | 2 |
| | outside | 17 | 3 | 2 |

**Table 2 : The CO Concentration in relation to different methods of ventilation.The measurements are from the Reference flat. See fig. 1 for locations of window (w) and door (D).**

| Type of Fuel | Ventilation Method | CO Concentration (ppm) | | | Wind Direction |
|---|---|---|---|---|---|
| | | Kitchen | bedroom | outside | |
| Coal Briquette | W5, W6, W3, D2, D3 closed | 32 | 64 | 03 | |
| | W5, W6, D2, D3 closed | 20 | 18 | 02 | |
| | W6, D2, D3 Closed | 10 | 11 | 02 | |
| Wood | W5, D2, D3, W6 closed | 28 | 26 | 03 | |
| | W5, D2, D3 closed | 18 | 17 | 02 | |

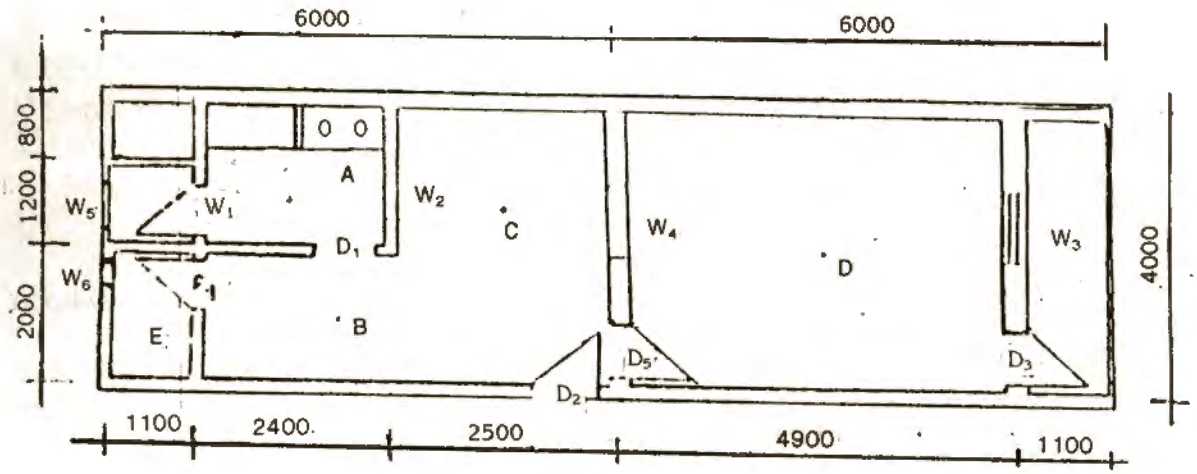


FIG. 1. : PLAN OF THE REFERENCE FLAT.

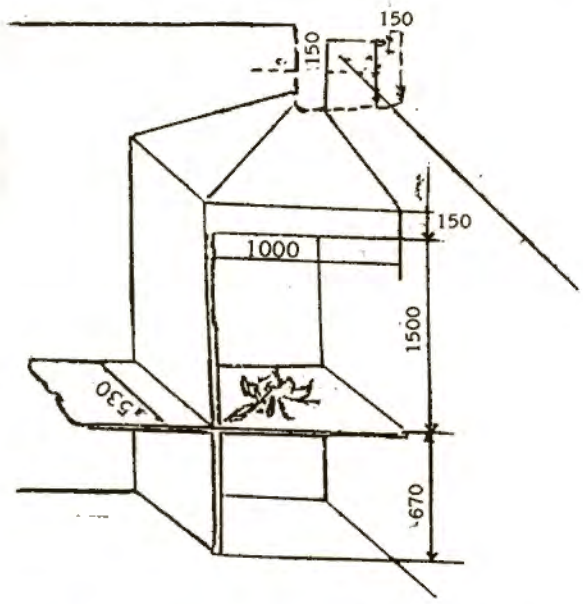


FIG. 2. : CHIMNEY HOOD USED IN THE REFERENCE FLAT

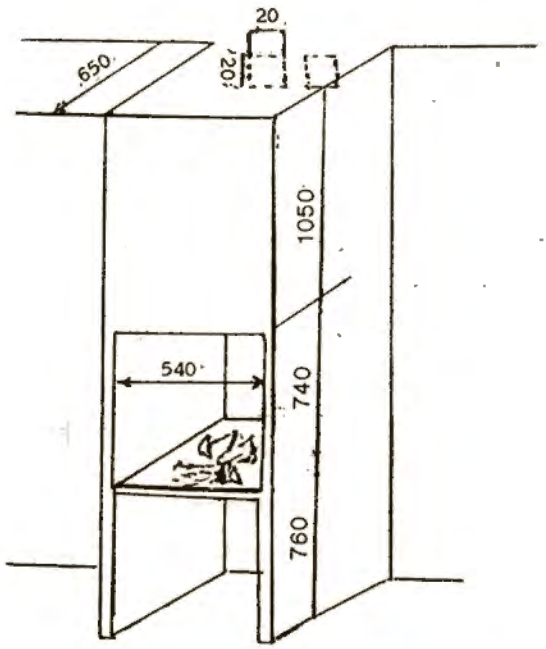


FIG.3 : CHIMNEY HOOD WITH COOKING WINDOW

The structure of the chimeny hood also affects the exhaust capacity of smoke and pollutants. The chimney hood using cooking window as seen in figure 3 has a better exhaust effect than the type of chimney hood alreaedy described in figure 2. The measurements on smoke and pollutant exhaust capacity in the experimental building recorded in table 4 shows the advantage of this type of chimney.

**Table 3. The Co concentration when changing the opening area of the chimney hood using wood as fuel.**

| | Opening area of the hood ($m^2$) | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | No hood |
|---|---|---|---|---|---|---|---|---|---|
| Ventilation Condition | | Co Concentration | | | | | | | |
| W6, W5, D2, D3, closed | When increasing the opening area of the hood horizontally | 8 | 9 | 10 | 13 | 15 | 24 | 28 | 30 |
| | When increasing the opening area vertically | | | 16 | 17 | 22 | | 28 | 30 |
| W6, D2, D3 closed | When increasing the opening area of the hood horizontally | 5 | 6 | 8 | 10 | 12 | 14 | 17 | 20 |
| | When increasing the opening area vertically | | | 12 | 13 | 15 | | 17 | 20 |

## COOKING FUELS AND STOVES IN RELATION TO INDOOR AIR POLLUTION

It is known that different kinds of fuels produce different sorts of pollutants during the burning processes Moreover, the same fuel of different qualities produces different amounts of pollutants. Different fuels also produce different amount of pollutants as different times during the burning process.

For example, when igniting coal briquettes, an amount of 0.20 kg of wood is also used, thus the CO concentration is very high at the begining and decreases gradually. When burning wood fuel, the CO concentraion increases gradually until a point where it reaches a stable factor, then decreases quickly when the fire is being extinguished. The measurements of these process are shown in table 5.

**Table 4 : The amount of CO concentration in the living room and the structure of the chimney hood.**

| Types of fuels used | Ventilation Conditions | Structure of the chimney hood | CO Concentration (PPm) | | |
|---|---|---|---|---|---|
| | | | Kitchen | bedroom | outside |
| Coal briquette | W3, W5, W6, D2, D3 closed | Hood with cooking window | 9 | 10 | 3 |
| | | Normal hood as in figure 2 | 32 | 64 | 3 |
| | W5, W6, D2, D3 closed | Hood with cooking window | 5 | 4 | 2 |
| | | Normal hood | 26 | 19 | 2 |
| Wood | W5, W6, D2, D3 closed | Hood with cooking window | 17 | 16 | 2 |

Thus, the qualities of cooking fuels and types of stoves have the following effects on the level of indoor air pollution:

- When wood is dry and carefully chopped the amount of air pollutants is reduced and the efficiency of cooking increases. The amount of pollutants produced when burning coal briquettes depends on the ingredients that constitute the briquette. The amount of pollutants also depends on the number of holes in the briquette and the pressure used to make the briquette.
- Different stoves have different effects on indoor air polluation. The open fire does not burn up the fuel and thus produces a lot of smoke dust and pollutants. The use of improved stoves contributes to a better burning effeciency hat also helps to reduce the amount of pollutants. The fixed stoves (built on the kitchen ground) with the chimney produces less smoke (smokeless stoves). The improved portable stoves should also need a chimney and chimney hood to evacuate the smoke.

**Table 5 : the amount of CO Concentration produces at different times during the burning process of different fuels. The measurements are taken at the Reference flat, when D2,D3,W5,W6, are closed. 0.200 Kg of wood is used wnen igniting the coal briquette.**

| Types of Fuel | Measurement Points | CO Concentration (PPm) in minutes | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 5 | 20 | 35 | 60 | 90 | 120 | 150 |
| Coal briquettes | In the Kitchen | 70 | 72 | 46 | 26 | 20 | 19 | 19 |
| | In the bedroom | 60 | 65 | 30 | 20 | 19 | 17 | 17 |
| Wood | In the Kitchen | 20 | 25 | 34 | 32 | 30 | 30 | 31 |
| | In the bedroom | 12 | 22 | 24 | 30 | 28 | 27 | 27 |

## CONCLUSIONS

Although the above measurements were of little normative signficances, they gave indications that the level of indoor air pollution depends on several factors such as ventilation, structure of the chimney and the chimney hood, and the kinds of fuels and stoves used.

On the basis of these indicators we have come to the following comments related to the possibilities of reducing indoor air pollution:

- The kitchen should be at the end of the wind direction, at a distance from the bedroom and living room.
- Chimney of a proper height is needed, and the chimney hood with "cooking window" is recommended.
- Cooking fuels should be dry, of the right size, and of the right composition (in the case of a coal briquette). The use of improved stoves with higher burning efficiency will also help to reduce smoke and pollutants in the kitchen.
- Laws to protect the environment need to be formulated and people's need to be motivated to follow these policies. The present criteria for hygeinic working environment in Vietnam are too general. A specific critertion on the allowance of toxic concentration in the home need to be established.

These are the general comments. Concrete solutions can be made with further investigations and measurements on the various parameters of indoor air pollution in different house types, different pollutants, etc.

## REFERENCES

1. Boiling Point, no. 28 August 1992.
2. Bao, Ngoc Phong Constructional Hygiene, Hanoi 1978.
3. Hygienic Standards. Ministry of Health, Hanoi 1992.
4. Indoor Air Pollution from Biomass Fuel, Report from WHO consultation, Geneva June 1991.
5. Nguyen, ba Phung, Labour Protection, 1978.
6. Nguyen, huy Con, Climate, Architecture and People, Hanoi, 1985.

★ ★ ★

# DENSIFICATION CHARACTERISTICS OF RICE HUSK UNDER COLD COMPRESSION

*Mukesh Shrivastava*
*Junior Scientist (P H T S )*
*College of Agril, Engg., R.A.U., Pusa, Bihar*
*and*
*Kishore K. Khankari*
*Grad. Research Asstt.*
*Deptt. of Agril. Engg.*
*University of Minnesota, U.S.A.*

***Biomass materials, especially agricultural residues are in many ways an attractive renewable source of energy. However, they suffer from low volume energy content which makes their energy conversion inconvenients and less efficient. Densification is the process in which agricultural residues are compacted to enhance their energy densities comparable to coal.***

***This paper deals with the feasibility of forming quality briquettes of rice husk by cold compression method without using any binder and studies the effect of applied pressure on the densification characteristics like free volume expansion, degree of densification and relative stability of rice husk briquettes impact loading.***

## INTRODUCTION

The agricultural sector of India gives rise to wide variety and large quantum of biomass every year and some of which is treated as a disposal nuisance but offers a good solution to the present energy crisis. The estimated annual production of agricultural residues in India is about 200 million tonnes which is equivalent to 80 million tonnes of petroleum products (1). Rice husk which is the major by-product of rice milling industry contributes about 10 percent to this valuable source of energy.

Rice husk can be converted to useful energy by thermochemical process like gasification and direct combustion. The bulk density of rice husk varies from

100-112 Kg/$m^3$ with an average gross calorific value of 3500 Kcal/Kg. On the contrary, the bulk density of charcoal if 200 Kg/$m^3$ With an average gross calorific value of 6300 Kcal/Kg(2). Thus the low volume energy density of rice husk makes the energy conversion inconvenient and less efficient. It requires frequent refuelling of the batch energy convertors with large size feed hoppers and creates the problem of free flow through hoppers by forming bridges and channels. Besides this it requires high cost of collection, transportation and storage. The only solution to these problems is to convert this valuable source of energy into a marketable commodity fuel which will be convenient for transportation, storage and energy conversion.

Densification is the process in which agricultural residues are compacted by compression or extrusion process with or without using any binding agent to enhance their energy densities comparable to coal. A good quality briquette should be strong enough to resist the breakage in handling and should be porous enough to give maximum heat output during combustion. Similarly it should have minimum free volume expansion after its formation and should be waterproof, resistant to weathering hazards. However all these properties including the energy efficiency of the system and the cost of the product depend on the kind and proportion of the binder used in the process or on the degree of heating in the binderless process.

Keeping this in view, the present work was carried out to determine the feasibility of forming quality briquettes of rice husk by cold compression method without using any binder and to study its densification characteristics like free volume expansion, degree of densification and relative stability under impact loading at various levels of applied pressure.

## EXPERIMENTAL PROCEDURE

Twelve-gram samples of unground rice husk with an average moisture content of 9.24 percent (w.b.) were compressed for ten minutes in a mild steel die of 2.7 cm diameter to form briquettes. A hydraulic press of 20 T capacity was used

for compression and the applied pressure varied from 350 kg/cm$^2$ to 2625 kg/cm$^2$ with a regular interval of 175 kg/cm$^2$.

The free volume expansion after the formation of the briquette was expressed as the percent increase in its volume when it was inside the die during compression. The volume of the briquette inside the die was determined from the maximum displacement of the piston. Similarly the degree of densification was expressed as the percent increase in the bulk density of rice husk due to briquetting. In order to determine the relative stability of the briquette under impact loading a similar method followed by Sah et al (3) was employed. It was expressed as the percent weight retained by the briquette after dropping it four times from the height of 1.83 meters on 25 mm thick mild steel plate.

**RESULTS AND DISCUSSION**

The results are presented in Fig. 1, Fig. 2, Fig. 3 and Table 1.

It was observed that rice husk briquette could not be formed in the pressure range of 175-525 kg/cm$^2$. The free volume expansion decreased rapidly with increase in applied pressure in the range 700-1575 kg/cm$^2$, while it remained almost constant at an average value of 99.2 percent in the pressure range of 1575-2450 kg/cm$^2$. Following prediction equation was developed:

$$1nv = 7.8326 - 0.511 \times 10^{-2} (p) + 0.2635 \times 10^{-5} (p)^2 - 0.4432 \times 10^{-4} (p)^3$$

With coefficient of regression ($R^2$)= 0.9821.

Where V is free volume expansion in percent and P is applied pressure in kg/cm$^2$. The maximum estimated value of the free volume expansion closely agrees with the observed one. It was also observed and estimated that the free volume expansion showed further decreasing trend at 2625 Kg/cm$^2$ pressure.

Similarly hundred percent increase in the percent densification was observed in the lower range of pressure from 700 kg/cm$^2$ to 1400 kg/cm$^2$. However, in the later range of pressure from 1575 kg/cm$^2$ to 2450 kg/cm$^2$ the percent densification remained almost constant at the average value of 632.35. Following prediction

equation was developed :

$1nD=3.6296+0.0042359\ (p) -0.021287 \times 10^{-5} (p)^2 + 0.3572 \times 10^{-4} (p)^3$

With coefficient of regression ($R^2$) = +0.9702.

Where D is the degree of densification in percent. A further increase in the degree of densification was observed at the highest pressure of 2625 kg/cm $^2$.

The relative stability of the briquette under impact loading increased with increase in applied pressure. But in the pressure range of 2100-2450 kg/cm$^2$, the percent weight retained by the briquette remained almost constant at the average value of 47.05. Following prediction equation was developed :

$1nW = -0.2991 + 0.3484 \times 10^{-2} (p) -0.725 \times 10^{-6} (p)^2$

with coefficient of regression ($R^2$) = 0.8010.

Where W is the percent weight retained by the briquette. This equation predicted the maximum value of weight retained as 48.74 percent at 2402.75 kg/cm $^2$ pressure which is very close to the observed one (Table 1).

**CONCLUSIONS**

The applied pressure in the range of 700 kg/cm$^2$ to 1400 kg/cm$^2$ has significant effect on the densification characteristics of rice husk under cold compression. However, in the latter range of applied pressure from 1400 kg/cm$^2$. to 2450 kg/cm$^2$ densification characteristics do not vary significantly and the briquettes formed in this range can be suitable for immediate use. It may be possible to form better quality briquettes at higher pressure than 2450 kg/cm$^2$ without using any binder.

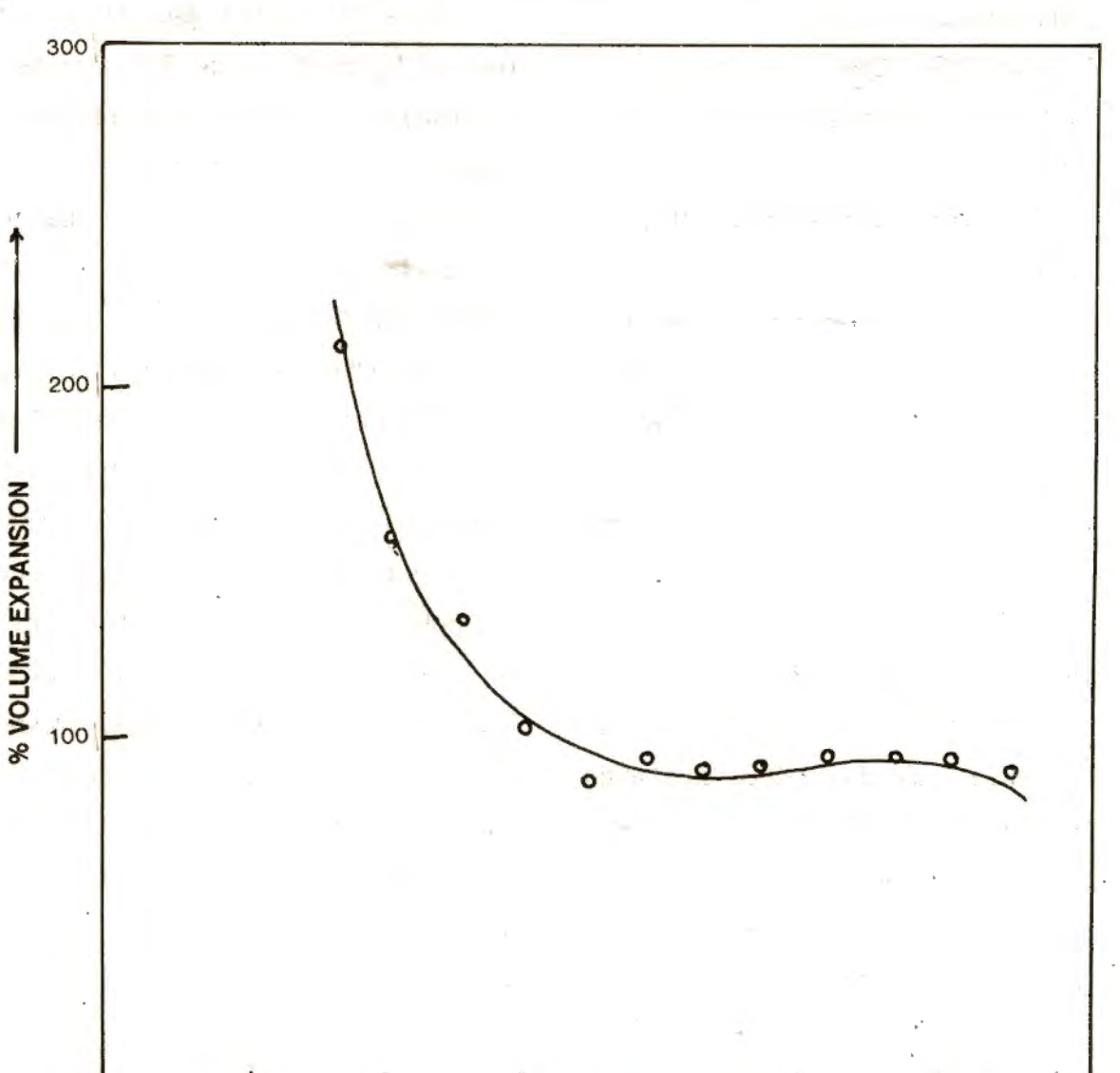


FIG. 1. : VARIATION OF PERCENT VOLUME EXPANSION WITH PRESSURE

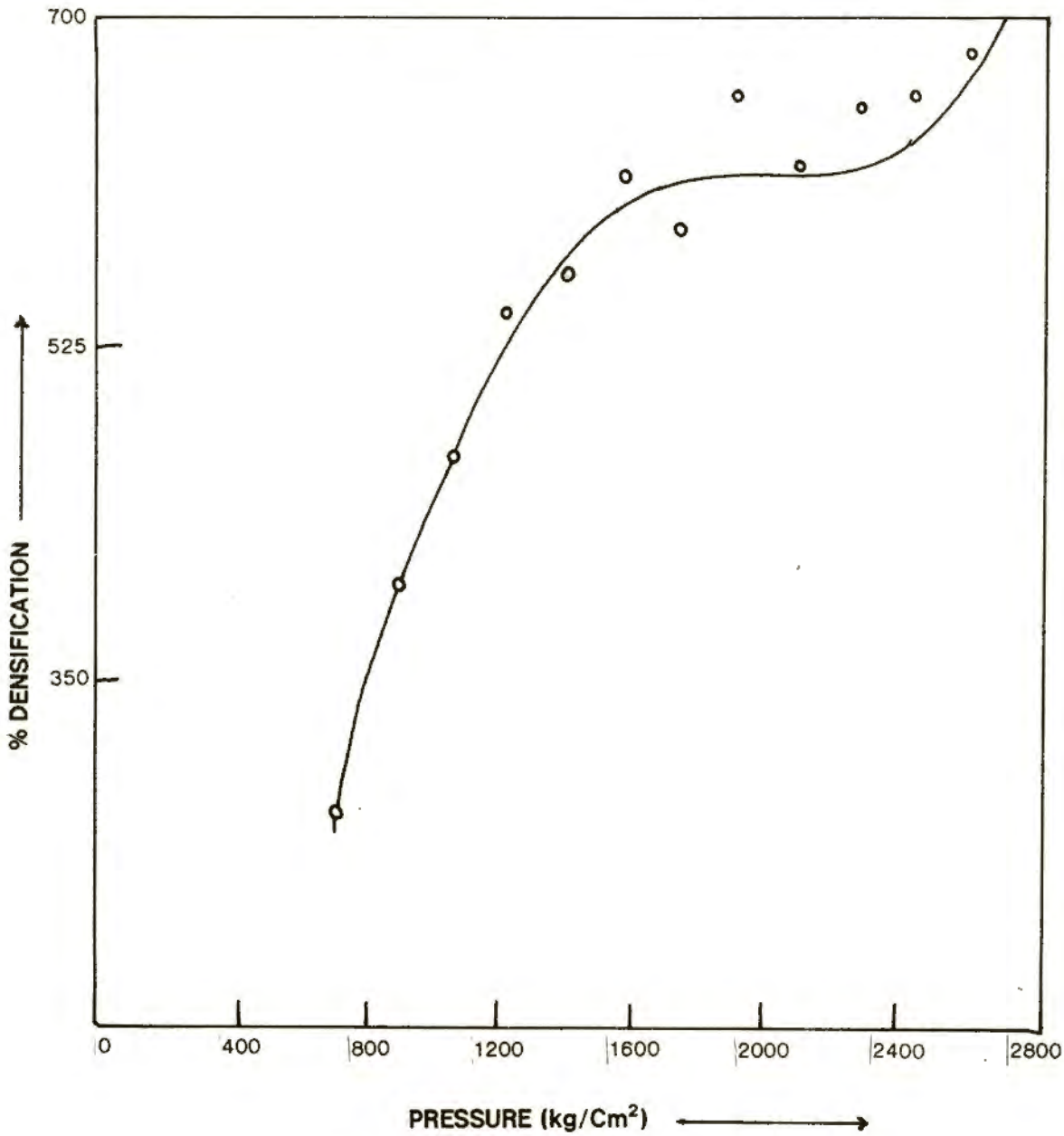


FIG. 2. : VARIATION OF PERCENT DENSIFICATION WITH PRESSURE

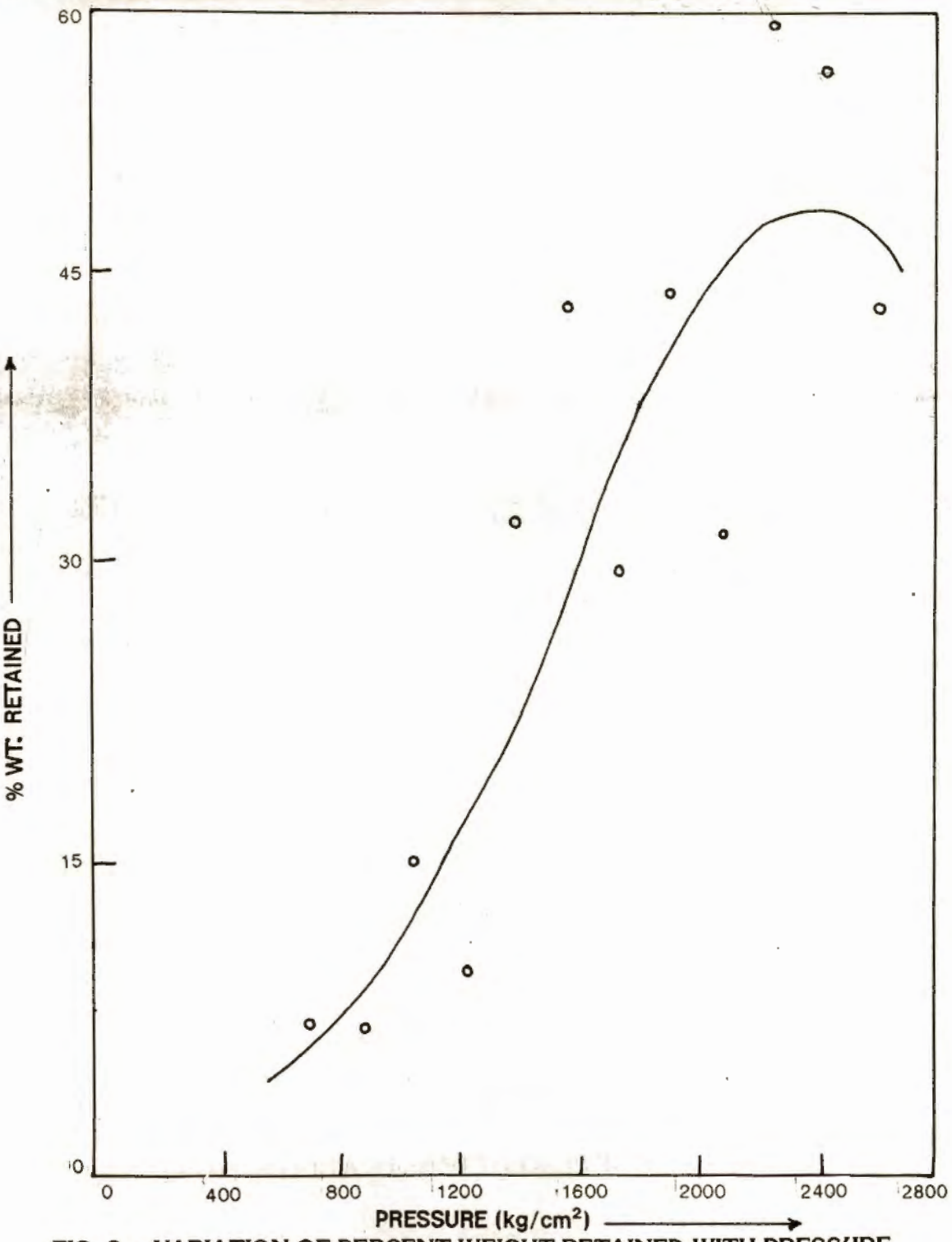


FIG. 3. : VARIATION OF PERCENT WEIGHT RETAINED WITH PRESSURE

Table - 1

| Densification characteristics | | observed Value | observed Pressure ($kg/cm^2$) | Estimated Value | Estimated pressure ($kg/cm^2$) |
|---|---|---|---|---|---|
| Free volume expansion (percent) | max. | 219.81 | 700 | 219.15 | 700 |
| | Min. | 93.74 | 1400 | 92.35 | 2625 |
| Degree of Densification (percent) | Max. | 682.61 | 2625 | 674.61 | 2625 |
| | Min. | 281.61 | 700 | 289.96 | 700 |
| Relative stability (percent wt. retained) | Max. | 57.19 | 2275 | 48.19 | 2450 |
| | Min. | 6.99 | 875 | 5.94 | 700 |

**REFERENCES**


1. Pandya, A.C., (1981). Energy for Agriculture in India, technical bulletin, CIAE, Bhopal.
2. Khankari, K.K., (1982). Some studies on the feasibility of fluidized bed gasification and the fuel characteristics of agricultural residues. M. Tech. Thesis, Post Harvest Tech. Centre, I.I.T., Kharagpur.
3. Sah, P.C. et. al, (1981). Compaction behaviour of straw, J. of Agril. Engg., Vol. XVIII NO.1. pp. 89-96.
4. Srivastava, M., (1985). Densification of rice husk by cold and hot compression methods. M. Tech. Thesis, Post Harvest Tech. Centre, IIT, Kharagpur.


★★★

# PITTING PEST AGAINST PEST

*Radhakrishna Rao*

***There are about 1 million insect-species-for more than any other form of life. They represent two thirds of all known living creatures and there are twice as many types of insects as plants. But only a few of them do pose a danger to crops. This is because of their greater vitality and reproductive capcity. It is not uncommon for a female insect to lay as many as 1,000 eggs, a fact exacerbated by the modern large scale monoculture which favours their explosive proliferation, especially under tropical conditions.***

The continuous and wreckless use of synthetic chemicals for the control of pests, posing a threat to agricultural crops and human health, is proving to be counterproductive. Apart from engendering widespread ecological disorders, pesticides have contributed to the emergence of a new breed of chemical resistant.

According to a recent study by the Food and Agriculture Organization (FAO) more than 300 species of agricultural pests have developed resistance to a wide range of potent chemicals. Not to be left behind are the disease-spreading pests, about 100 species of which have become immune to a variety of insecticides now in use.

One glaring disadvantage of pesticides application is that they, while destroying harmful pests, also wipe out many useful non-targeted organisms that keep a check on the growth of the pest population. This results in what agroecologists call the "treadmill syndrome". Because of their tremendous breedings potential and genetic diversity, many pests are known to withstand synthetic chemicals and bear offspring with a built-in resistance to pesticides.

The havoc that the "trademill syndrome" can bring about is well

illustrated by what happened to cotton farmers in Central America. In the early 1940 s, basking in the glory of chemical based intensive agriculture, the farmer avidly took to pesticides as a sure measure to boost crop yield. The insecticides was applied eight times a year in the mid 1940 s, rising to 28 in a season in the mid 1950s following the sudden proliferation of three new varieties of chemical resistant pests. By the mid 1960 s the situation took an alarming turn with the outbreak of four more new pests, necessitating pesticide spraying to such an extent that 50 percent of the cotton production cost was accounted for by pesticides. In the early 1970s, the spraying frequency reached 70 times a season as the farmers were being pushed to the wall by the invasion of genetically stronger insect species.

Most of pesticides in the market today remain inadequately tested for properties, that causes cancer and mutations as well as for other adverse effects on health, says a study by us environmental agencies. On the other hand, the US National Resource Defence Council has found that DDT was the most of a long list of oangeious chemicals in use.

In the face of the escalating perils from indiscriminate applications of pesticides, a more effective and ecologically sound strategy of biological control involving the selective use of natural enemies of the pest population is fast gaining use of natural enemies of the pest population is fast gaining popularity though, as yet. It is a new fields with limited potentials. The advantage of biological control in contrast to other methods is that it provides a relatively low cost, perpetual control system with a minimum of detrimental side effects. Bio control, when handled by experts, is safe, nonpolluting and self-dispersing.

The Commonwealth Institute of Biological Control, (CIBC) in Bangalore, with its global network of research laboratories and field stations, is one of the most active, non-commercial research agencies enlarged in pest control by setting natural predators against parasites. CIBC

also serves as a clearing-house for the export and import of biological agents for pest control worldwide.

CIBC successfully used a seed-feeding weevil native to Mexico to control the obnoxious parthenium weed. Excrt devious influence on agriculture and human health in both India and Australia. Similarly, the Hyderabad-based Regional Research Laboratory (RRL) Supported by CIBC, is now trying out an Argentinian weevil for the eradication of water hyacinth, another dangerous weed which has become a nuisance in many parts of the world. According to Mrs. Kaiser Jamil of RRL. "The Argentinian weevil does not attack any other plant and a part of adult bugs would destory the weed in 4-5 days. CIBC is also perfecting the technique for breeding parasites that prey on "disapenc scale" insects notorious defoliants of fruit trees and plantation crops in the US and India.

How effectively biological control can be pressed into service is proved by the following examples:

In the late 1960s, when Sri Lanka's flourishing coconut groves were plagued by leaf-mining hisspides, a larval parasite-imported from Singapore brought the pest under control.

A Natural predator indigenous to India, Neodumetia sangawani, was found useful in controlling the Rhodes gress-scale in many parts of the US.

The proliferation of spodeptcra-a parasite with a liking for cotton, maize, tobacco and tomato-in the Indian farmlands was curbed by an egg-eating parasite imported from New Guinea.

By using Necochetina bruci bectic native to Brazil, scientists at Keral Agricultural university freed a 12 km long and 12 km wide canal from the chitches of the weed Salvinia molesta, popularly called "Africa Payal", in Kerala, About 30,000 hectares of rice field in Kerala are infested by this weed.

The ruthless depredation on cassava fields in Africa by two Latin American insects-spider mite and cassava meanly bug (inadveriently introduced into Zaire

and Uganda)- is now being brought under control by the release of two natural predators, one an extremely profilfic beetle belonging to the genus dionas, the other a feast-prolifrating wasp. Apoanagyrus lopezi.

Meanwhile, researchers at Loyal college, Madras, have found that the banana spider twice the size of a common honey bee, is capable of devouring cockroaches and goes after other insects only if there are no cockroaches. "It is an spider of cosmpolitan habitat and with excellent hunting shell. It can be used for biological control of cockroaches "says" Miss. Vijayalakshmi in a doctoral thesis on the spider. India made a mark in the commercial exploitation of insects for controlling harmful parasites with the setting up of the Bio-Control Research Laboratory (BCRL) at Bangalore. A private sector enterprise, BCRL is the first commercial insectary of its kind in the country. Selling benefical insects to farmers and cultivators. Basically, a commercial insectary is a sort of biofactory where parasites and predators are cultured and mass-produced and offered for sale in "Tricho Cards". The most important factor for effective biocontrol is the availability of required quantities of healthy natural enemies for timely and repeated release into the parasites infested fields.

Insectaries have made significant contributions in curbing the drerededations of parasites in several countries. About 50 commercial insectaries are in operation in the US and Canada. In the Soviet Union, there are some 10 biofactories mass-producing more than 15 species preadator for release in about 10 m hectares of farms and fields.

According to Mr. Manjunath, chief of BCRL, "Losses due to the pests are so widespread and colossal, it is difficult to meet the demand of growers for supply of natural enemies." Losses come to a staggering 40.5 per cent for cotton, 20 per cent for sugarcane, and about 10 per cent for coffee. He adds. "continuous production of vigorous colonies of parasites requires experience and

knowledge of parasite life cycles." Otherwise, it may lead to the production of seemingly healthy but generaly weak progress which- deteriorate in size, fecundity longevity and general vigour.

As an African entomologist put it, by letting loose pests on pests, researchers are giving only a practical shape to the 300 million-year-old natural process.

## The Toll of Environmentally Induced Illnesses

**The Cost of environmentally induced illnesses, both those of health care and lost labour productivity, are everywhere on the rise. Because of the long delays between exposure to carcinogenic or other health-damaging pollutants and the manifestation of illness, the full effect is only begining to be felt. Thus far, epidemiologists are picking up increases in respiratory illnesses (such as bronchitis, asthma and emphysema), nervous system disorders, allergies, skin diseases, liver diseases, cancers of every kind and birth defects among others. When the health care costs of environmentally induced illnesses already reported and those associated with the projected increased exposure to ultraviolet radiation are totalled, they will represent an enormous drain on the financial resources of societies everywhere. These illnesses will also take a heavy toll on labour force productivity.**

**Worldwatch Institute Report**

# PADDY TRANSPLANTER

The unit consists of G.I. sheet seedling tray, steel pipe handle in which fork type pipe fingers attached for picking the seedling. All these parts based on the steel pipe and angle iron frame which is mounted on the wooden float. It is a modified form of the I.R.R.I. type transplanter. In this mat-type seedling is required for planting and the process of raising the seedling is simple.

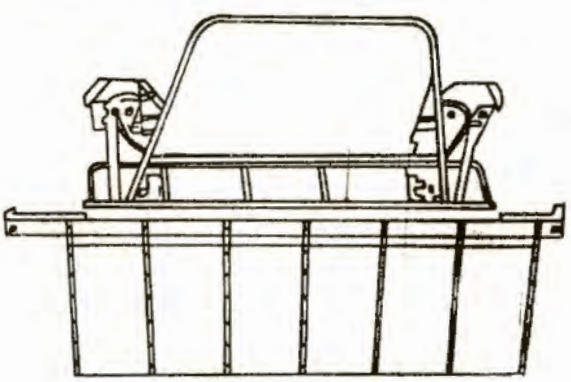

FIG. : PADDY TRANSPLANTER

## SALIENT FEATURES

1. This Machine is operated by human power.
2. Capacity— 0.3 to 0.4 acre/day depending upon the operator.
3. Weight— 30 kilogram with wooden float.
4. Six row plantation at a time.
5. Plant to plant distance can be adjusted by the operator.
6. Man power required for paddy planting in 0.4 acre is only 3 persons.
7. It can be easily transported from one place to another.
8. Spare parts are easily available after breackage & it can easily replaced.
9. Saving of time, timely planting and high yield is obtained.
10. Lesser quantity are destroy seedlings.
11. Life is about 10 years excluding wooden float.

## GENERAL

(a) The paddy transplanter is already proven in field trials.

(b) 0.3 to 0.4 acre/day transplantation was done at six rows.

(c) This is a simple floating type paddy transplanter which is operated by hand simply by pull and push. The operator stands behind the machine and operates the handle, when all other parts work simultaneously planting 6 hills, 20 cm apart at a time. The operation when moves the machine backwards to a required distance and plants the next row. When the seedlings of the tray are exhausted it is taken out and replaced by another.

## TESTS, DEMONSTRATION AND RESULTS

The machine has been initialy tested on the experimental farm at C.D.R.T., Institute of Engineering and Rural Technology, Allahabad and then several demonstration have been conducted amongst the farmers in the villages near by the Allahabad District.

The results was quite satisfactory and appreciated by the village farmers, also they have showed their willingness to adopt this technology.

## MATERIAL REQUIRED FOR 6- ROW PADDY TRANSPLANTER

| S.No. | ITEM | QTY. |
|---|---|---|
| 1. | Hex. Head Nut & Bolt with washer (8 mm dia x 50 mm. long) | 30 Nos. |
| 2. | Hex. Head Nut & Bolt with washer (12 mm. dia x 75 mm.long) | 4 Nos. |
| 3. | Hex. Head Nut 12 mm. dia. | 4 Nos. |
| 4. | Hex. Head Nut & Bolts with washer (10 mm. dia x 62 mm. long) | 4 Nos. |
| 5. | Fly Nut & Bolt with washer (8 mm. dia. x 38 mm. long) | 2 Nos. |
| 6. | Hex. Head Nut 16 mm. dia | 1 No. |
| 7. | Washer 16 mm. dia & 3 mm. thick | 2 Nos. |
| 8. | M.S. Bush 10 mm. dia | 1 No. |
| 9. | M.S. Shaft 10 mm. dia x 100 mm long | 1 No. |

| | |
|---|---|
| 10. Cotter pin 3 mm. dia x 25 mm, long | 12 Nos. |
| 11. Moped chain 45 cm. long | 1 No. |
| 12. Free Wheel (bicycle) | 1 No. |
| 13. G.I. Sheet 22 gauge (150x90 cm.) | 1 pc. |
| 14. M.S. Angle Iron 19 x 19 x 3 mm. | 9 Meter. |
| 15. M.S. Flate 25 x 6 mm. | 2 Meter. |
| 16. M.S. Round bar 8 mm. dia. | 2 Meter. |
| 17. M.S. pipe 16 gauge & 19 mm. dia. | 11 Meter |
| 18. M.S. Pipe 16 gauge & 12 mm. dia | 1 Meter. |
| 19. M.S. Sheet 12 gauge, 20 x 20 cm. | 1 Pc. |
| 20. Rivets 8 SWG | 100 gm. |
| 21. Nails 50 mm. long | 100 gm. |
| 22. Rubber sheet 10 mm. Thick (60x60 mm) | 1 pc. |
| 23. Wire 10 SWG | 1 Meter. |
| 24. Welding Rod 3.15 mm | 20 Nos. |
| 25. Hard wood (Seal/mahua) planks (6'x1'x3/4") | 1 No. |
| 26. Green Paint Enamel | 1/2 Lit. |
| 27. Brush 50 mm. wide | 1 No. |
| 28. Skilled Labour | 2 No. |
| 29. Helper | 2 Nos. |

## COST OF OPERATION PER ACRE FOR MANUALLY OPERATED PADDY TRANSPLANTER (6-ROWS) AT THE FOLLOWING DATA

| | |
|---|---|
| 1. Paddy Transplanter Cost | Rs. 1,800.00 |
| 2. Life (Excluding woodden float) | 10 years. |
| 3. Hours used in a year | 250 hours. |
| 4. Wage per day | Rs.30/- |

5. Junk value at initial Cost 10%

6. Interest Rate 15%

A. COST OF MACHINE OPERATION PER ACRE:

Junk Value = 1800 x 10/100 = Rs. 180.00

(a) Depreciation per year = (1800-180)/10 = Rs. 162.00

(b) Interest at average cost per year = (1800+180)/2 x 15/100 = Rs. 148.50

(c) Shelter per year @ 1% = 1800 x 1/100 = Rs. 18.00

(d) Repair & Maintenance per year @ 5% = 1800 x 5/100 = Rs. 90.00

Cost per hour = (a+b+c+d)/250

= (162+148.5+18+90)/250

= 418.5/250 = Rs. 1.674

Say Rs. 1.70

Area covered in 8 working hours is 0.3 acre/day and manpower required 7 for planting in one acre.

Cost of machine operation per acre

= (1.70x8) + (7x30)

= 13.6+210=Rs. 223.60

B. NURSERY RAISING COST PER ACRE:

(a) Thin polythene sheet about 30 sq mtr. @ Rs. 1.25/sq. m. Rs. 37.00

(b) Bamboo strip 2.5 cm wide, about 60 mtr. length (about one Bamboo 7.5 cm dia is required) Rs. 40.00

Total cost of paddy transplanting per acre = A+B =223.60 + 77.50 = 301.10 Say Rs. 305/-

C. Cost of Transplantation of 1 acre in a day by traditional method (average 25 person needed) @ Rs. 30/- person Rs. 750/-

★★★

## NO WOOD, NO PESTS

In a bid to protect its forests from a voracious, microscopic pest called the pinewood nematode, the European Community (EC) has banned imports of untreated softwood lumber from Canada.

The ban affects the bulk of Canada's $ 388.5 million yearly export of untreated lumber to EC states. Now all Canadian lumber exports to Europe, except for cedar, must be kiln-dried or heat-treated to protect it from the nematode, which has destroyed large tracts of pine forest in Japan.

Angry Canadian officials say the EC is endangering the livelihood of many workers in the provinces of Nova Scotia, New Brunswick and British Columbia. They concede, however, that pine exports should be heat-treated or kiln-dried.

## IPCL DEVELOP WASTE WATER TREATMENT TECH.

The scientists working with the public sector Indian Petrochemicals Corporation Ltd (IPCL) located on the outskirt of the city Baroda, have developed a novel and cost-effective process for the treatment of cyanide-containing waste water generated during the manufacture of acrylo-nitrile (ACN).

This is the first of its kind in the country and probably among a few in the world. The heart of the process is the specially-developed highly active microbial consortium. This grouping in the presence of oxygen and other nutrients, converts undesirable cyanide and other pollutants into non-toxic materials which settles as sediments and leaves clear treated effluent.

The process developed is environment-friendly. After rigorous laboratory and pilot plant level testing, the technology has been successfully put to commercial use in IPCL for treating about 300 cu mt per day cyanide-bearing waste water.

## CALL FOR PROPER USE OF BIO-ENERGY RESOURCES

Experts are of the opinion that bio-energy resources should be effectively managed for meeting energy needs. The key word they assert is "managed" and not "conserved". That means grow more

than the society consumes, and consume less by using more efficient technologies.

In a publication entitled "Biodiversity for Energy", the experts visualise biomass energy as a central part of future sustainable energy supply, both through economic and technical feasibility.

The publication has been brought out by the Indian Association for the Advancement of Science and Food and Agriculture Organisation of the United Nations.

The publication, focusses attention on the significance of biomass energy for India and the necessary policy interventions for technical, fiscal and adminstrative support. It stresses identification of energy use and potential of fossil fuels substitution. It calls for more energy supply to rural areas and integration of energy policy with agriculture.

The experts are of the opinion that to achieve such a realistic target, a pragmatic time-frame of biofuel introduction is essential. In the short term, it is necessary to tap agricultural, forestry and animal residues. In the medium term, biofuel production from marginally deresources provide rural jobs.

Energy plantation will strongly support preservation of plant diversity. It will help to restore degraded sites by testing, conserving, multiplying and using germplasm adapted to areas sites terrestrial and aquatic biomass play an important role for providing food, fuel and fodder.

The publication also reviews the status of technologes for production and conversion of biomass for energy. Three important technologies for conversion are briquetting, gasification and biogas production.

The experts said that wherever technologies have been developed to a significant level, it is necessary for the Government to support setting up of large demonstration units in relevant industries. Wherever incorporation of emerging technologies for conversion required R&D, it should be supported by the Government.

The publication also focusses attention on the Government's launching

of a national programme in different sectors for bio-energy utilisation relating to combustion and co-generation recycling of industrial, urban and municipal wastes biomass gasification and biomass briquetting so that maximum benefit could be achieved, vis-a-vis imported fossil fuels.

The perception of biomass energy has changed in a number of western industrialised countries. It has led to biomass gaining a growing and significant share of the primary energy sector in the US (4 percent), Sweden (16 percent) and Austria (10 percent). Biomass is increasingly viewed as an environmentally and socially advantageous source of energy.

## SOLAR ENERGY MAKING IT MANDATORY

To stimulate the stagnant demand for solar heating devices, the Union ministry of non-conventional energy sources (MNES) and the ministry for urban development, have chalked out a scheme to make the installation of solar and air heaters mandatory for all Government buildings.

Govt. had decided to introduce a soft-loan facility to encourage the utilisation of solar thermal devices. The loans would be made available through the Indian Renewable Development Agency, the financing arm of the MNES.

Manufacturers of solar devices have greeted the announcement with circumspection. Government assistance is necessary if our industry is to survive. We are still at a disadvantage compared to the electrical sector, whose competitiveness is based on low power tariffs and economics of scale.

## WOMAN FARM WORKERS SHRUG OFF PESTICIDE MENACE

Despite women farm workers being aware of the hazards of pesticide poisioning, a recent survey has found that most of them take tea and ghee and then rest to get over headache, nausea or dizziness instead of seeking medical advice. The women said that the doctor's high fees and the distance they have to travel prevents them from seeking medical aid.

The survey also found that most

women labourers complained of itching, burning sensation, rashes and wounds on their arms and legs because of working in freshly dusted or sprayed farms. The survey was conducted by the Organisation of Consumers Forum, in collaboration with the Confederation of Indian Consumer Organisation and the All India Women's Conference. "The study concentrated on women as they are far more suseceptible to the hazards of pesticide poisioning and no Government data was available on the status of the women worker.

The effect of pesticides on agricultural workers has gained importance because of the large-scale occupational and accidental poisioning of farm workers directly involved in the mixing and spraying of pesticides the world over.

**THE OTHER DANGER**

Experts warn the spraying of pesticides in the desert will have adverse effects and can not prevent future locust attacks.

With tonnes of toxic chemical being poured into the desert soil to kill locusts, experts warn the area's delicate ecosystem will be damaged. The widespread use of banned organocholrine pesticides—dieldrin in particular is expected to have serious ecological effects. Central Arid Zone Research Institute in Jaisalmer use a mild mixture of dieldrin (18%) and there is no cause for alarm. The effect of these pesticides will be manifest in the years to come.

Although no reports of cattle or water-poisoning have been received. The chemicals will have a long-term effect. They will enter the roots of fodder grass and kill desert animals, including natural enemies of locusts.

But the officials of CAZRI concedes "pesticide damage to the ecosystem has to be balanced against the expected destruction by locusts."

Western researchers debating the effectiveness of chemical treatment recommend that locust plagues be allowed to run their course. Chemical control operations do not seem to prevent an area

from becoming heavily infested again.

## MUSHROOMS GAINING POPULARITY IN TAMIL NADU

Though a recent addition to the diet, mushrooms are becoming increasingly popular fare in Madras city today.

Gourmets consume around 350 kg of mushrooms per day in the city. This is a sharp increase from the 10-15 kg in demand just a few years ago. Capitalising on this are 30-40 small-scale oyster mushroom growers in the city, generating Rs 15,000 worth of business everyday. There are several others spread out over the rest of Tamil Nadu.

Oyster mushroom farms are an attractive business proposition due to low investment, simple technology and a potentially large market.

Oyster mushroom cultivations can be begun with just 100 square feet of space. The most cost-efficient method of production involves growing mushrooms on straw, which reduces the gestation period (as against growing it on wood) to half, to 12 days. The cost of production is between Rs. 12-15 per kg. while its market price is Rs. 35-40 per kg.

However, in the absence of organised marketing arrangements, mushroom growers are finding it difficult to bridge the gap between themselves and the consumer. Individual growers find it difficult to market small quantities individually, with the state Government also not providing any marketing support.

However, Coimbatore, which consumes mushroom nearly 200 kg per day, has an efficient marketing system, whereby availability is ensured all over the city.

Incidentally, in Karnataka, the Karnataka Agro-food Corporation undertakes to purchase mushrooms at the rate of Rs. 28 per kg.

## INSECTS : NATURE'S CLEANING CREWS

We scald, scorch, spray and swat them. We stomp them as they skitter across the floor, dust them into oblivion on the leaves of our plants and long for a summer day without them. They are insects, those little six-legged aliens that seem placed on earth only to torment.

Professor Stebbing, the writer of a famous book on forest entomology, says, "ninety nine per cent of the insects cause no problems, may are beneficial and most are innocuous."

Consider what insects are really up to and what the world would be like without them.

Without bees to pollinate plants, our diets would be limited. Most fruits and vegetables would be gone because without insect pollination they would not exist.

Termites are perhaps the most avid recyclers on earth, though builders would tell you otherwise. Every branch blown down by a strom and tree toppled by old age becomes dinner and a work site for termites.

But when we build a house and termites move into recycle it, we call them pests.

Flies infest garbage and hassle picnickers because they like the taste of meat and other organic matter and because it is their natural job to devour them. Roads would be littered with dead animals if it weren't for flies.

The major ecological role for insects is to be food for everything else. Frogs, birds and fish would fade away without insects. Bears, moles, skunks and raccoons would have to change their diets.

The fact is that insects serve many purposes—predatorial, as food and as cleanup crews.

To find the beginings of man's struggle against insects, we must go back 40,000 years. At that time insects had already inhabited. Earth for 350 million years but Homosapiens had just evolved. Early humans and insects got along just fine. Man was just another of the hunters and gatherers.

It was when humans gave up hunting and gathering that their pereception of insects changed. From being benevolent rivals for food, they became pests. Imagine this : when the first farmer planted a crop and loked forward to a harvest the bean-eating insect, that had till then been a minor irritant, suddenly became a pest because it was competing for his hardwon food.

According to Professor Stebbing, the

one percent non-beneficial insects more than make for the 99 percent beneficial ones. This one percent destroys crops and property and spreads diseases, apart from being a nuisance.

However, even in the case of this one percent, there is a thresholds of 'insect-density' beyond which insects really are a problem instead of being just a bother. Even so, just because an insect is a pest at a certain level, it does not mean it has to be done away with totally.

People scouting their gardens lawns and flowers for insects should try to balance their desire for freedom from insects with the right of insects to a habitat. And we should not worry so much about insects gnawing holes in leaves if the blooms are surviving.

A caterpillar in a mature tree is not going to hurt anything; It's just another part of nature.

One looks forward to day when people appreciate insects for what they do to-beautify the landscape and feed people.

## ABOUT 5 LAKH CHULHAS TO SAVE FUEL WORTH Rs. 19 Cr.

The Ministry of Non-Conventional Energy Sources has installed 4,79,000 improved chulhas (IC) against a target of 3,60,000 during the first six months of 1993-94 effecting an annual saving of 3,35,000 tonnes of fuelwood worth Rs. 19 crores.

According to the estimates of the Ministry each improved chulha saved 700 kg of wood a year worth Rs. 400, offsetting the full cost of a new chulha in three months. A recent evaluation survey of the National Council of Applied Economic Research revealed that 95 percent of the working IC owners reported saving in time on cooking and collection of wood. Reduction in the incidence of eye and lung diseases was reported by 62 percent.

This programme also contributed significantly to employment generation and saving of commercial fuels. The study indicated that IC provided direct employment of 8,10,000 mandays for every two million chulhas built a year. Regarding commercial fuel saving each IC on an average annually, beside fuel wood saved 177 kg of dungcake and 77 kg of agricultural wastes also saved, 1.3 kg of

coal and 1.8 litres kerosene. Fifteen million IC have been installed so far affecting an annual saving of 19,500 tonnes of coal and 27 million litres of kerosene.

Twenty technical backup units were set up for research and development in the chulha technology and to cater to the specific technical and local requirements. These units are providing training to self-employed workers, potters, village and artisans and the functionaries of the implementing agencies. The ministry has estimated that improved chulhas could result in a saving of 84 million tonnes of fuelwood a year.

As a result of upgradation of technology and making the systems cost-effective IC costing between Rs 100 and Rs 200 with thermal efficiency up to 50 percent were developed to meet the needs of the weaker sections. Technical changes introduced over the years include removing damper, adding ceramic lining and using cast iron.

A Central subsidy of Rs. 50 for each fixed chulha and 33 to 50 percent for portable chulhas is being provided. Besides this financial assistance in the form of soft term loans, 100 percent exemption from excise and sales tax and substantial reduction in the custom duty has been provided to the IC manufacturer.

★★★

**'It's not as easy as it looks;**
**It'll take longer than you think;**
**It'll cost more than you've budgeted for :**
**If anything can go wrong it will'.**

***Attributed to Murphy (Irish King 6th Century AD)***


## WOMEN AND ENVIRONMENTAL MANAGEMENT

ANUTECH Pt. Ltd. Australia has designed a short course on "Women and Environmental Management" to be held from 7th November to 9th December 1994 at Canbera, Australia. The course is designed for professionals and practitioners in environmental management who would like to gain skills in gender-balanced environmental and social assessment, natural resource management, and conflict resolution in the context of national goals and regional cultures. Course includes seminars, tutorials, field tours and discussion. Both women and men may apply.

**For further information contact :**

Mr. George Collett
Course Coordinator
ANUTECH Pt. Ltd
GPO BOX 4
Canbera Act 2601
Australia

## CONSERVATION OF FOREST BIO-DIVERSITY

Kasetsart University, Bangkok, will organize a Seminar on "Community Development and Conservation of Forest Biodiversity through Community Forestry", from 26-28 October 94, at Bangkok the main discussion will be on the need for conserving forest biodiversity, combining objectives of development and biodiversity, and the role of community forestry.

**For further information contact :**

Mr. Somsak Sukwong
Director, RECOFTC
Kasetsart University
P.O. Box 1111
Bangkok - 10903
Thailand

## SUSTAINABLE DEVELOPMENT OF DEGRADED LAND

Indian Grassland and Fodder Research institute, will now organize its postponed conference (Postponed from

December 93) on "Sustainable Development of Degraded Lands through Agro-forestry in Asia and the Pacific" at New Delhi. The conference is sponsored by Range Management society of India. Topics include alternative land management systems, designing agro-forestry systems for degraded lands, potential use of multipurpose trees, bioresource ecology, silvipastoral systems and socio-economic issues.

**For further information contact :**

Mr. Punjab Singh
Director
Indian Grassland and Fodder Research Institute,
Jhansi - 284 003
India

## ENVIRONMENT EDUCATION

Two, three day training programmes in "Environment Education" will be conducted by the Environment System Branch, Development Alternatives, at New Delhi from 10 to 12 November 1994. The focus areas of the course are : Resource Conservation & Monitoring %, Resource Degradation and Implications, Pollution Monitoring, Waste Minimization-Reduce, Reuse & Recycling, Approaches to environment education.

The course is for NGO's and Development Professionals and also for school teachers.

**For further information Contact :**

Co-ordinator, Environment
Education & Training,
Development Alternatives
B-32 TARA Crescent
Qutab Institutional Area
New Delhi - 110 016

## SOCIAL ECOLOGY AND EDUCATION

An International Conference on "Social Ecology; Science and Education" organized by the Commission for the Protection of Nature of the Russian Geographical Society, will be held from 24-26 June 95 in St. Petersburg, Russia, The conference will focus on the ties between liberal arts, science, and technical disciplines, The conference will work in sections on ecology and economics, law politics and other areas.

## FOOD SAFETY

The International Life Sciences Institute (ILSI) Bangkok, Thailand, in cooperation with the World Health Organisation and the Food and Agriculture Organisation, is organizing the second Asian "Conference on Food Safety", on Septembter 18-23 1994, at Bangkok.

The conference will review and update current research and promote regional harmonization in the development and improvement of safe food for better health nutritional status, and environment conservation. Participants are scientists from academia, government and industry and other concerned with food quality and safety.

**For further information contact :**

Dr. Saipin Maneepun
Secretariat,
Second Asian Conference on
Food Safety, ILSI Thailand
C/o IFRPD, 50, Phaholyothin Road,
Jatujak, Bangkok 10903
Thailand

## WIND ENERGY SYSTEM

Institute of Engineering & Rural Technology (IERT) will be organize a "Two Weeks Short Term Training Programme" on Wind Energy Systems at IERT from 16-29 November 94.

The course will cover all aspects of wind energy including wind mills— its Govt. policies and plans. The course is suitable for Teachers and Projects Officers from Polytechnic, Engineers/Technical Officers of GOs/NGo working in Renewable Energy Fields.

**For further information contact :**

Short Term Training Programme
Curriculum Development Centre
Institute of Engineering & Rural Technology
26, Chatham Lines,
Allahabad (U.P.)

## POWER & ENERGY '94

"Power & Energy 94" (Exhibition) is being organised by Nowea International of Germany with its Indian partner intech trade fair marketing co. Pvt. Ltd. (Sponsored by IBPL-Urja Research Foundation) at Pragati Maidan, New Delhi, From 6-11 October 94.

The Exhibition will exhibit mainly (a) Power generation plants & related equipments including Thermal, Hydroelectric, Solar, Wind, Biomass, Nuclear and others (b) Energy Conservation (c) Environmental Protection and many others related to energ & Power.

**For further information Contact :**

Intech Trade Fair Marketing Co. Pvt. Ltd.
122, Maker Chambers V,
Nariman Point
Bombay 400 021
India.




## CLIMATE CHANGE AND ENERGY EFFICIENCY IN INDUSTRY

Climate change is one of the most critical environmental issues which we are facing today. Though it is impossible to predict the exact effects of global climate change, we can reduce the root cause of global warning: the build up of green house gases in the atmosphere. Because one of the main cause of this, build up is the burning of fossil fuels to generate energy for industry, it is essential that we all, including those of us in industry, become energy conscious and energy efficient.

This publication has been prepared by Conservation Association (IFIECA) and UNEP's Industry and Environment Office (IEO). The publication aims both to raise awareness of the problem and to give practical suggestion on how to reduce energy consumption while improving efficiency. This publication has been developed to help industrial management and government being exploring the potential benefits of improved energy efficiency. It is essentially an introduction to the process of energy auditing, supported by practical example.

The first part of the publication provides phase by phase description of Energy Efficiency plan including: Assessment, Measurement, Evaluation and Implementation. Second part examines the science of climate and climate change and covers the significance of human activity, including the use of fossil fuels, and greenhouse effects. A list of resource persons and list of publication on related subject are given in Part Three.

"Climate Change and Energy Efficiency in Industry" published by UNEP, Paris-France and IPIECA-London, p-64, English.

## HOW TO MAKE AND OPERATE THE IWATE BLACK CHARCOAL KILN

Charcoal is a major fuel in developing countries. Charcoal serves the needs of millions of people everyday in cooking, blacksmithing, and in many other major activities. Its advantages are its light weight, high calorific value, smokeless burning, ease of transport and low cost. Charcoal content easily be substituted with other energy sources. Efficient production

of charcoal can help to slow down deforestration. The Iwate kiln falls into the category of fired clay kilns. It can be constructed with local, low cost materials and produces exception all high quality charcoal. The original designs comes from Japan, from the city of Iwate. Japanese charcoal making dates back to the 9th or 10th century and the Iwate is one of the most basic of traditional kilns. It provides a permanent. Kiln structure and the advantages of protection and greater control over carbonization processes. There is minimum level of investment, yet the kiln produces charcoal of high quality. This manual is a result of practical training efforts held in Pontianak, West Kalimantan. After the construction of traditional Japanese Black Charcoal Kilns of Various shapes and sizes, the large Iwate Charcoal Kiln proved the most efficient and useful and appropiate. The manual is mainly on Iwate Black Charcoal Kiln with illustration and other necessary details.

The manual is devided into chapters starting from Background and Improvment of Traditional Charcoal Kiln. Chapter Two and Three describes Prepration for Production and the Introduction and Iwate Charcoal Kiln. The main chapters i.e Four & Five give the details of Construction & Operation of Iwate with many illustrations.

"How To make And Operate The Iwate Black Charcoal Kiln" published by Asia Regional Cookstove Program, Yogyakarta, Indonesia, 1994, p, 39, Englilsh.

**CLIMATE CHANGE BULLETIN**

United Nations (UN), United Nations Environment Programmes (UNEP) and World Meteorological Organisation (WMO) are jointly publishing quarterly, "Climate Change Bulletin". The global environment are changing so rapidly, for example after examining the present climatic condition of Sharda desert scientist/ environmentalist predicts that our children and grandchildren will live in a world of higher temperature and changed climate patterns, Droughts, Floods, Storms and other climate and weather extremes may become more frequents. Social and political tensions


would worsen competition for water and other scarce resources intensified. This extra pressure would make it even more difficult to stove the kinds of problems and crisis that we are already facing today.

Desertification, Environmental Degradation, Greenhouse effects, besides all other above mentioned problems, facts and predictions related to global climate and climate change for sustainable development are discussed in this quarterly bulletin. For further information about the journal contact: IUCC, UNEP, Geneva Executive Center, CP 356, 1219 Chatelaine, Switzerland.

★★★

## Smoke-Free Environment

**A Smoke free environment, in public or at home, is self-promoting. A young girl who is used to living in a smoke-free environment is likely to percieve the odour of tobacco smoke as unpleasant and later on to insist on clean air at work as well as home, thus contributing to the concept of a tobacco-free society and life style as the social worm...**

**Smoke free cookplaces prevent people from starting to smoke in stressful situations, which are reported to be a cause of smoking initiation among young workers. Smoke-free public places such as restaurants are important in underlining the prevailing social worm and also in helping smokers to quit and preventing relapse. Smoke-free environments are particularly important in schools, where they should form part of a comprehensive policy on smoking which includes staff and students.**

# SUBSCRIPTION FORM

Editor :
**RURAL TECHNOLOGY JOURNAL**
Information Service Division
Centre for Development of Rural Technology
Institute of Engineering and Rural Technology
Allahabad - 211 002 (INDIA)

Enclosed a Bank draft.....dated.....
of Rs./US Dollars.....for one/two/three year (s) subscription to the RURAL TECHNOLOGY JOURNAL by air mail/surface mail (please strike out as applicable).

**Note : Bank draft may be made in favour of "I.E.R.T. - Commercial Activity A/c."**

**Individual/Institutional Subscription :**.....
Name of Subscriber/Institution :.....
Address :.....
Contact person :.....
Designation :.....
Date.....Signature.....

**Subscription for one year :**

| | **Inland** | | **Overseas** |
|---|---|---|---|
| | | Surface | Air Mail |
| Individual : | Rs. 75.00 | US Dollars 25 | US Dollars 30 |
| Institution : | Rs. 150.00 | US Dollars 40 | US Dollars 50 |

# RURAL TECHNOLOGY JOURNAL

## AIMS AND SCOPE :

Rural Technology Journal is published by Information Service Division, Centre for Development of Rural Technology, Institute of Engineering and Rural Technology, Allahabad (India). The purpose of Journal is to provide a forum for exchange of views, information and create awareness in the field of Rural Technology, its development and transfer to the rural areas, technological products and processes, methodologies and approaches etc. Effort is being made to ensure that this Journal become relevant not only for this country but to all those nations, groups and individuals, in any part of the Globe who have concern to contribute towards the welfare of the under privileged rural communities. The Journal is divided into following main sectons :—

| | | | |
|---|---|---|---|
| 1. | Portfolio | — | (Articles/Papers) |
| 2. | Tool Box | — | (Information on Rural Technology/Processes) |
| 3. | Spot Light | — | (News and Views) |
| 4. | Futurama | — | (Forthcoming Events : Training Programmes, Seminars, Symposium, Workshop etc.) |
| 5. | Book Bag | — | (News on Books and Publications) |

## NOTE FOR THE GUIDANCE OF AUTHORS :

Papers/articles information packages, technical queries and related materials are cordially solicited. Manuscripts should be sent to :—

The Editor
Rural Technology Journal
Information Services Division
Centre for Development of Rural Technology
Institute of Engineering and Rural Technology
26, Chatham Lines, Allahabad—211002 (India)

There is no limit to the length of contribution, but it is suggested that a maximum of 6,000 words or equivalent be used as a guide (approximately 6 to 7 pages).

1. The complete manuscript should be written in English and the desired order contents of Title, Abstract, List of Symbols, Main Text, Acknowledgement, Reference and Appendices. The Standard International System of Units (SI) should be used.
2. The manuscript should be typed on one side of the paper only (preferably 8"×11" bond paper) with double spacing between lines and 1.1/2, margin on the left.
3. Two copies of the manuscript and illustrations (one set original) should be sent to the Editor.
4. The title should be brief (maximum of 150 characters including blank in between words or other non-alphabetical characters) and followed by the author's name, affiliation and address.
5. Internationally accepted standard symbols should be use. In the list of symbols Roman letter should precede lower case.
6. Graphs, charts, drawing sketches and diagrams should be black and white prints of glossy paper and preferably 3.1/2"×7" size.
7. Illustrations should be numbered consecutively, given proper legends and should be attached at the end of the manuscript.

# IERT SHELTERED WORKSHOP IN SERVICE OF PHYSICALLY HANDICAPPED.

**INFORMATION SERVICE DIVISION**
CENTRE FOR DEVELOPMENT OF RURAL TECHNOLOGY
INSTITUTE OF ENGINEERING & RURAL TECHNOLOGY
26, CHATHAM LINES,
ALLAHABAD - 211 002, INDIA.

**GRAM : APOLY Phone : 601402**
**Telex : 540-260 IERT-IN**
**Fax : (0532) 600615**