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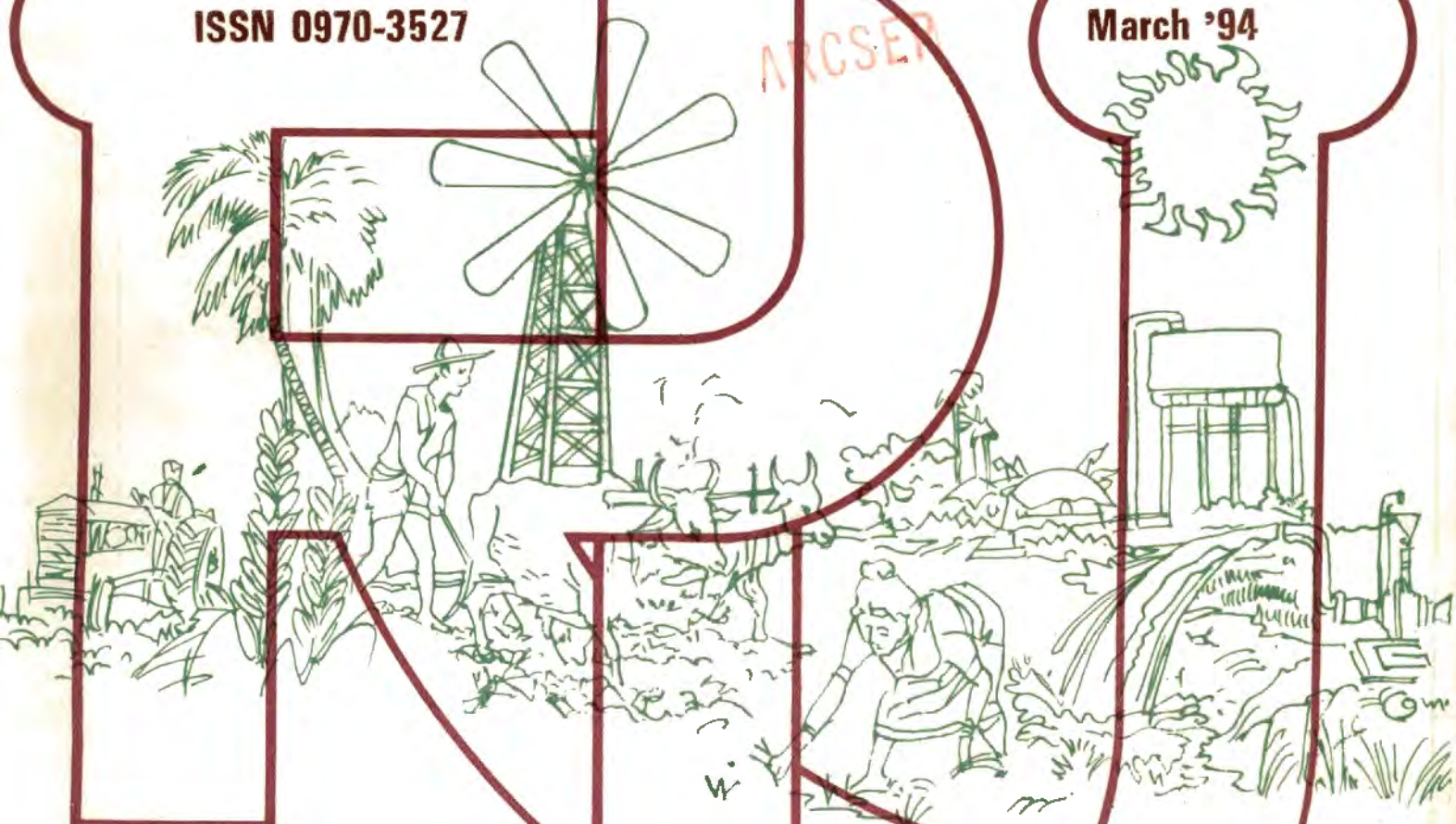

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Editorial

The very ego of human beings to conquer nature has been at the root of all problems witnessed in social, economic and technical activities of the so-called civilised societies. Whether its abuse of human rights, abuse of environment, abuse of resources (wastefuel consumption accompained by unbriddled pollution) and use of science and technology for creating a synthetic, inhuman and sickening opulence for a small section of society, all arise from the basic weakness of subjugation of others and self centerdness. All human knowledge and skill, and therefore science and technology too, are instruments to be used in an egalitarian and human manner. Whatever ills of technology we witness today, having social and ecological impacts of adverse nature, arise out of this human weakness. The realisation therefore of the fact, that nature should not be fought as it can never be conquered, can lead to a better quality of life. And if, in addition, there is wisdom to assimilate the powers of nature, together with overcoming the urge of subjugation of others and self-centerdness, then we can definitely hope to save the planet earth and provide a quality of life free from disease, hunger, ignorance and deprivation.

Therefore, the stalwards in human knowledge and skills alone can not build such a future, rather they will, together with the rest of the society, need, social leaders with virtues as outlined above to rid the society of all its infirmities. As we move into the next century, we face a single most important- the determinant of our same future do we have such leaders or shall we (each one of us) at least now pledge ourself to be such a leader in our micro-surroundings.

Publication List 1993

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DEVELOPMENT OF CONSTRUCTION TECHNOLOGY TO PREVENT ALGAE GROWTH IN CONVEYANCE CHANNELS

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Presence of algae on masonry surfaces of structures is a common problem. Chemical treatment like application of copper sulphate is a proven method to prevent algae. As construction method forming component of construction will go a long way to practice, different construction methods were taken up in the study presented and their efficacy reported.

INTRODUCTION

Algae growth indicated by green patches are a common occurrence in masonry surfaces of structures used for conveyance or storage of water in the climate prevailing in Tamil Nadu. Though application of algae is good for rice cultivation, presence of algae in water used for drinking purposes is a health hazard for both animals and human beings. Hence, it is essential to prevent the growth of algae on masonry surfaces in contact with potable water. Studies have indicated that application of chemical like copper sulphate is effective in prevention of algae growth. But any application recurring in nature entails cost and so is a costly proposition. Therefore, it was aimed to develop a construction technology, practiced as a component of overall construction to prevent algae growth. With this in view, a study with five different construction measures along with three proven chemical measures replicated twice was taken up at College of Agricultural Engineering.

MATERIALS AND METHODS

Eight existing channels with continuous flow for minimum three hours duration alternating twice in a day with stoppage of flow was identified as study channels. The channels were prefabricated with cement mortar 1:3 having rough surface and free from crevices. Eight treatments viz., (1) Copper Sulphate 2% solution (2) Snowcem single coat (3) white wash single coat (4) Black oxide (5) Cement wash (6) Sodium flouride 0.5% concentrated (7) White wash double coat (8) Snowcem double coat were given for five metres length of the channel covering the entire surface bed, sides etc. and the effect of prevention were evaluated by estimating the biomass of algae per sq. m. and ranking the algal production.

The procedure adopted for this is after giving the wash with different materials. Water was allowed to pass intermittently for 6 hours a day. Keeping the channel unused for at least a day to become dry. Then, this procedure was repeated for 2 months. The stability of colour was observed after 2 months. The sediments were collected at random from the entire 5 metre length of this channel for studying the growth load of algae. All the eight treatments were preceded by th rough cleaning of the surface. For this the wetted surface of the channel was cleared from the sediments and rubbed with sand paper to wipe out any dust adhering to the surface. Enumeration of algal population was done following the MPN technique.

RESULTS AND DISCUSSION

The algal population in the sediments taken from the conveyance channel under different treatments are given in Table 1. The cost of different treatments are furnished in Table 2.

The percentage of algal population observed under different treatments are : 0%, 97.5%, 96.85%, 96.85%, 89.62% 74.07%, 74.07%, 35.19% and 35.19% respectively thus indicating the Copper sulphate 2% application is found to be superior followed by white wash double coat, white wash single coat, snowcem double coat, snowcem single coat, sodium flouride 0.5%, thus indicating construction technology of usual maintenance by white washing or washing with snowcem proves to be as effective as side of the channel.

Table 1 : Estimation of Biomass in the Irrigation Channel
(Sides of the channel)

S.No.	Treatment	Weight of biomass in the sides of the channel in grams	Area (m^2)	Biomass per Sq. m.	Effect of prevention	Cost of the treatment per sq. cm in Rs.	No. of algal population ranking
C	Control	135.900	0.7	194.14	0%	—	—
T_1	Copper Sulphate 2% solution	10.875	0.7	15.54	91.99%	—	1
T_2	Snowcem paint 1 coat	35.280	0.7	50.39	74.04%	—	5
T_3	White wash 1 coat	20.400	0.7	29.14	84.49%	—	3
T_4	Black oxide	62.250	0.7	88.93	54.19%	—	7
T_5	Cement finish	67.700	0.7	96.71	50.18%	—	8
T_6	Sodium fluoride 0.5% concentrated	35.930	0.7	51.19	73.63%	—	6
T_7	White wash 2 coat	15.775	0.7	22.53	88.39%	—	2
T_8	Snowcem paint 2 coat	34.940	0.7	35.62	81.65%	—	4

Table 2 : Cost Analysis Table

S. No.	Treatment	Quantity of chemical used	Cost per kg Rs.	Total cost for coating 5 m length of channel	Cost per sq. m. Rs.
1	2	3	4	5	6
T_1	Copper sulphate 2% solution (750 ml) + 500 c.c. shell lime + 200 cc glue mixture				
	Copper sulphate	15 grams	250.00		
	Shell lime	500 grams	2.00		
	Glue mixture	200 grams	22.00	18.30	(1) 5.12
T_2	Snowcem paint 1 coat : snowcem	500 grams	16.00	8.00	(5) 2.24
T_3	White wash 1 coat	1000 grams	2.00	2.00	(7) 0.50
T_4	Black oxide + Glue mixture (500 grams)				
	Black oxide	250 grams	25.00		
	Glue mixture	500 grams	22.00	17.25	(2) 4.8
T_5	Cement finish	500 grams	1.50	0.75	(8) 0.2
T_6	Sodium fluoride (Naf) 0.5% concentration (750 ml) + 500 cc of stone lime + 50 cc shell lime + 200 cc glue mixture + 200 cc yellow colouring				

1	2	3	4	5	6
	Sodium fluoride (NaF)	3.75 grams	210.00		
	Stone lime	500 grams	2.50		
	Shell lime	500 grams	2.00	13.45	(3) 3.76
T_7	White wash 2 coat	1500 grams	2.00	3.00	(6) 0.84
T_8	Snowcem paint 2 coat	800 grams	16.00	12.80	(4) 3.58

chemical application. The cost of different treatments per sq. metre as per PWD schedule of rates for year 1988-89 worked to Rs. 0.84, Rs. 0.56 and Rs. 0.21 respectively, indicating the treatment of cement solution wash is the cheapest and white wash single coat ranks next. Other factors observed in the study are that 1) whenever there is stagnation of water, incidence of algae growth was appreciable and hence it leads to the presumption that the channel should have sufficient slope to prevent stagnation of water and there should not be any obstruction like projections or deposition on the side or bed of the channel to retard flow. Further it was observed in channels allowed with intermitent flow incidence was more than in continuous flow indicating that alternate flow and stopping to be discouraged and continuous flow have to be maintained.

REFERENCES

1. Atsushi Watanabe- The Journal of General and Applied Microbiology, Volume 5, 1959, P. 85
2. Chapman - Algae, Macmillan and Company Ltd.,
3. A.C. Roy and Ralph, L. Rickets (1980)- Algae and fungus control in masonry structures Journal of Agricultural Engineering today, April 1980, Page 25-26.

MATHEMATICAL MODEL FOR SELECTION OF MOST ECONOMICAL BULLOCK DRAWN TILLAGE AND SOWING IMPLEMENTS

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Agricultural Machinery consitute an important engineering input to agricultural production. The optimum farm machinery management occurs when the economic performance the total machine system has been mechanized. Graphs are developed for bullock drawn tillage and sowing implements for most economical purchase of implement based on total cost per hectare, annual use and width of implement.

INTRODUCTION

Farming and farm machinery management in developing countries like India, which is fully dependent upon agriculture, has to change from a way of life to a business. Machinery management has a very vital role in today's farming operations because of its direct relation in optimizing land, labour and capital to return a optimal profit. Decision for selection of appropriate machinery for a particular farm size is based upon capital available with farmer. In India small land holdings contribute the major chunk of land holdings and major farming operations are performed by Draught animals. The optimum farm machinery management occurs when the economic performance of the total machine system has been maximized.

DEVELOPMENT OF MATHEMATICAL MODEL

The total cost is generally desired on either a per unit area or production unit basis. Determination of the total cost per unit of work involves the following factors:

1. Annual use of implement, in hours or hectares.

2. Effective field capacity of implement in hectare per hour.
3. Total annual fixed costs for implement.
4. Total operating costs per hour (repairs, fuel and lubricants) for implement.
5. Labour cost per hour.

The graphs were developed on the guidelines of ISI code No. IS: 1964-1979 on guide for estimating cost of farm machinery operation. The total cost of operation per hectare was calculated in terms of purchase price of the implement (P) which is considered to be a variable as implement's cost vary. Total cost of operation per hectare is plotted against width of the implement (10-150 cm) for annual hours of use ranging from 50 to 400 hours. As these graphs were plotted for bullock drawn tillage and sowing implement speed of operation and field efficiency was assumed to be 2.5 km/h and 65% respectively. Fixed cost calculations include purchase price (P, variable), interest (12%), insurance, housing shelter etc. (6%) and depreciation (10%). While calculating variable costs only repair and maintenance cost were considered on the basis of TAR values (Table 1) for ten years of useful life as per ISI code. Fuel, lubricants, labour etc. were neglected in calculations as they vary with time and place. The graphs are plotted on a semi log paper with total cost per hectare in multiples of purchase price taken on log scale for useful life of eight years.

USE OF GRAPHS

Suppose a farmer wants to purchase an implement of width 'W' and use it for 'A' hours in a year. From the graph one can calculate the cost per hectare in multiples of purchase price of the implement and finally one can conclude the amount of money to be spent for the purchase of implement which will be most economical.

STEPS

1. Select desired width of implement on X-axis.
2. Draw perpendicular line from the selected width of implement to intersect at desired annual use.
3. Draw perpendicular from above point of intersection on Y-axis to get the cost per hectare in multiples of purchase price of implement.

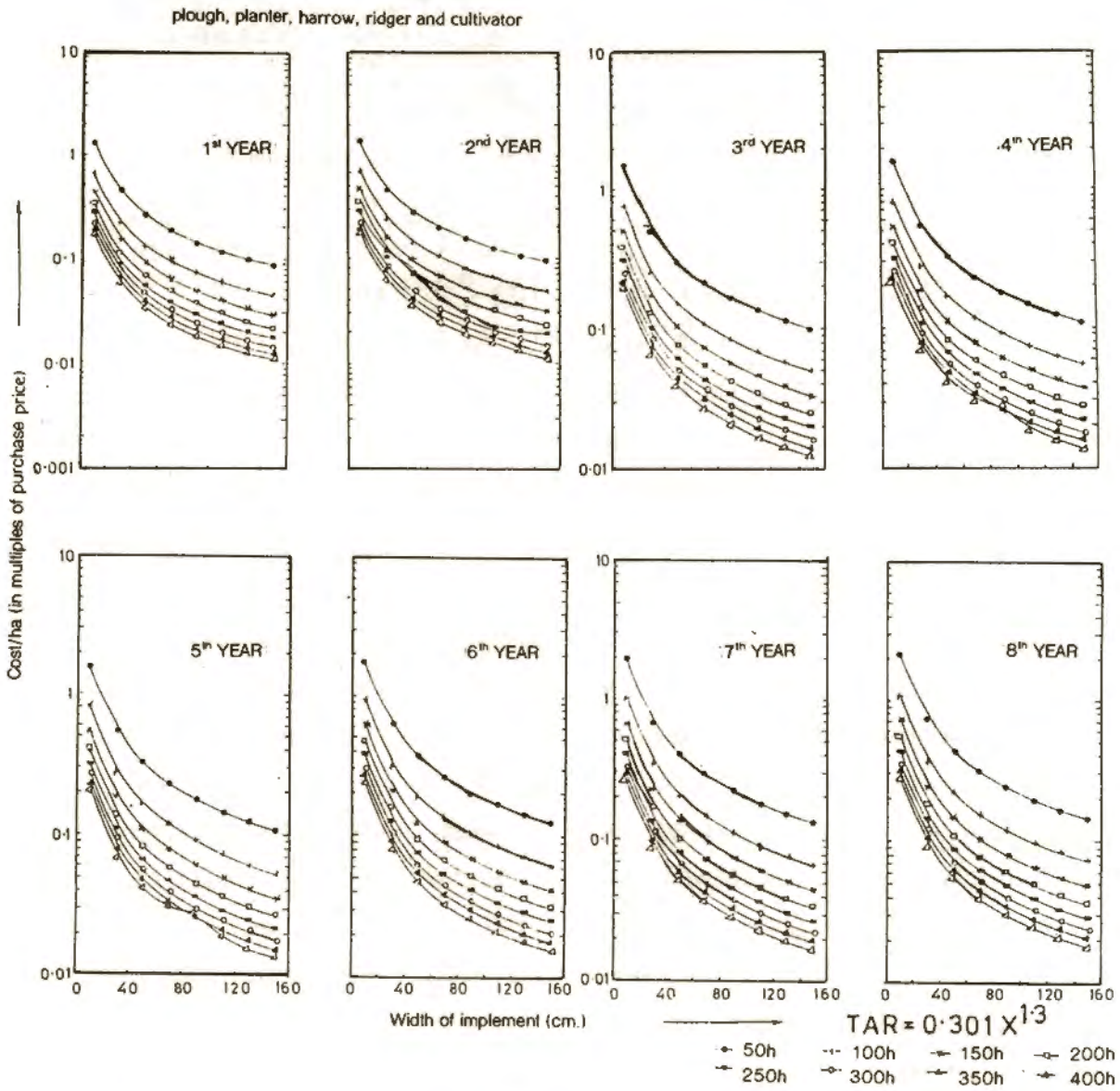

Fig. 1. Relationship between width of implement and total cost per hectare

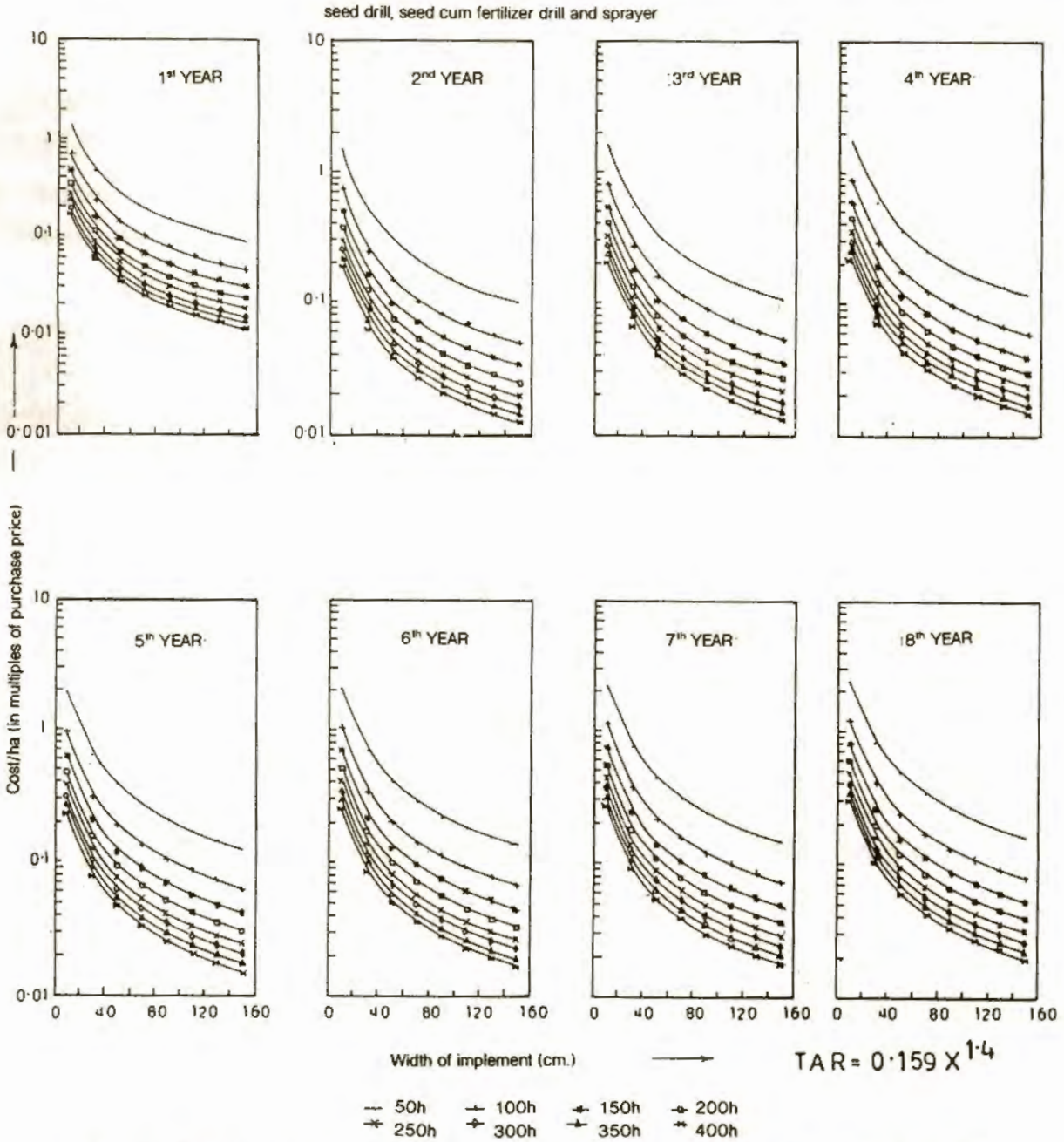

Fig. 2. Relationship between width of implement and total cost per hectare

4. On the basis of amount which one can spend on unit hectare (cost/ha) economic cost of machine can be calculated by equating amount (cost/ha) in '3' and amount per hectare (cost/ha) '4'.

If the cost of the implement is more than the calculated, one has to either compromise on annual use or width of the implement to the most economical. Graphs are plotted from first year of use to eight year of use so as to get purchase price of second hand implements. These graphs can also be used vice versa.

Table 1 : Formula for TAR at any point in a implement's life.

S.No.	Particulars	TAR
1.	Plough, planter, harrow, ridger and cultivator.	$0.301 X^{1.3}$
2.	Seed drill, seed cum fertilizer drill and sprayer.	$0.159 X^{1.4}$

TAR = Total accumulated repair cost divided by purchase price of the implement expressed as % age.

X = 100 times the ratio of the accumulated hours of use to the wear out life given, (assumed to be ten years).

Source : IS 9164-1979 (amendment No. 1 April 1982).

References

ISI.1979. Indian Standards guide for estimating cost of farm machinery operation IS: 9164. Indian Standards Institute, New Delhi.

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EMPLOYMENT OPPORTUNITIES IN SMALL SCALE, VILLAGE AND COTTAGE INDUSTRIES

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The author has discussed various problems of unemployment in our country, employment opportunities in various sectors of industries. He has also suggested the various industrial policies and incentives and support to small village and tiny industries. Various new policies issued by Govt. for Handloom, handicraft and other village industries has also been summarized here.

GANDHIAN APPROACH

Gandhiji's dream of Indian village in Independent India contain intelligent human being who would not live in dust and darkness as animals. Men and women would be free and able to hold their own (self dependent and self suficient) against anyone in the world - "No one will be idle, no one will wallow in luxury. Everyone will have to contribute his quota of manual labour. When the villages are fully developed, there will be no dearth in them of men with a high degree of skill and artistic talent." He saw freedom not as an end in itself, but as a means, "To wipe the tears out of every eye, to people famishing and idle, the only acceptable form in which God can dare appears is work and promise of food as wages....." -not even the staunchest non-believer could have expressed it more forcibly than he did. He was very firm in his opinion, "The poverty of India cannot be removed by mass production— but by production by the massess." He said, "Today, the villages are dung-heaps. Tomorrow, they will be like tiny gardens of eden where dwell highly intelligent folk whom no one can deceive or exploit. Think the poorest Indian you know and decide whether the measure you propose to take will help him." As John Kennedy said in his famous

"inaugural" in 1961: "if we cannot help the many who are poor, we cannot save the few who are rich."

PROBLEM OF UNEMPLOYMENT

A basic problem that is facing the country is the increasing pressure of population on the land and the need to create massive employment opportunities. It is no wonder that, inspite of repeated proclamations to create new employment opportunities, employment (and under-employment) rose steadily with each successive plan. It was about 7 million in 1951, became 9 million at the end of First Plan, 11 million at the end of the Second, 13 by the end of the Third and probably ranges around 50 million today (registered and unregistered). With a population increasing by 13 million every year, in the next 20 years as many as 60-70 million jobs may have to be created outside the agricultural sector and this magnitude of job creation will be impossible in the framework of conventional industrial growth. In practice the states like Uttar Pradesh, Bihar, Madhya Pradesh, Orissa and Rajasthan, which comprises a significant proportion of area and population of country, continue to be backward, while the vast territories of the north-east are a virgin area whose full potentiality is yet to be assessed. Even in the so-called developed states, the bulk of the new prosperity went to urban areas. For example, in Maharashtra, it was Bombay that claimed a lion's share of the new prosperity. It was the same story in Tamil Nadu, Andhra Pradesh, Karnataka, West Bengal and Gujarat- it was Madras, Hyderabad, Bangalore, Calcutta and Ahmedabad that began to grow while the rural areas continued to live as before. While large industries and even modern medium and small industries began to come up in the Urban areas, the lot of the village spinner, carpenter, cobbler, blacksmith, potter and the skill artisan became worse since with increasing affluence their skills had slowly become irrelevant and could not met the requirement of the rural communities which they had served for centuries. The organic structure (relationship) between them and the community was broken. Increasingly, the people in the rural areas looked to the towns for machine-made-goods, whether textile or consumer goods-while the skilled handicraft which at one time, were functional became purely prized possessions at exhorbitant prices to

be sold only to foreigners or in the export markets. Thus production capabilities shifted to the towns, the villages becoming the centres of consumption.

ROLE OF SMALL-SCALE VILLAGE & COTTAGE INDUSTRIES AND EMPLOYMENT OPPORTUNITITES:

It became obvious by the end of the Fourth Plan (1974) that unless a new strategy were evolved, the basic problems of growth and social justice would not be met. Creation of even a single job in the heavy industry sector is becoming increasingly expensive-it costs as much as Rs. 100,000 for one job and to create 60-70 million jobs would take an astronomical sum of money which the country can hardly afford. From a purely pragmatic (treating facts of history with reference to their practical lessons) point of view, there seems, therefore, no option for the country but to press on with the small, village and cottage industries programme as the most effective way of alleviating the problem of unemployment. A high school or a simple college education no longer equips a person with the skills that are necessary to take his place amongst the ranks of employed. It is, therefore, necessary to cut down (due to limited resources) drastically on general university education, which does not provide necessary skills for undertaking any job, and increase vocational education after a minimum level of education. The whole area of "Services" is likely to emerge predominently as a major field of growth for employment, particularly in urban areas. So far the emphasis in the small industry programme has been in making a "Product", and all incentives have been linked to this effort. Lately, recognition has been accorded to services-auto repair and maintenance, shops, agro-services centres, but there is a little reluctance to extent it to the whole spectrum of other services such as : beauty shops, laundry, hair-dressing saloons, restuarant, tourism etc. All these have become useful and even essential elements of society and yet there is a hesitation to regard them as small industry. The concept of small enterprise as embracing both the industrial (purely manufacturing sector) and service sector would need to be expanded significantly.

It is also true to say that the employment opportunities afforded in marketing and transporting will indeed be far greater than those in manufacturing. It is for this reason that the establishment of commercial estates-on the pattern of industrial estates-has to be advocated to provide a systematic support to the establishment of marketing out-lets in smaller towns and villages and included in small scale industries sector-for various incentives.

An improvement trend in the last few years, which is likely to grow, is the convergence of small industries in rural areas with other elements of the decentralised sector such as handlooms, handicraft, khadi and village industry and rural artisans. Each of these have programmes formulated and implemented by different agencies at the state and national level. There is a common thread running through all the programmes of assisting the small people and the weaker sections of the population and this cannot be regarded purely as economic need but also a socio-economic need. The rural artisan, for instances, is not a small industrialist but he has potential to become one. As his technology is upgraded and his production goes beyond the subsistence level, he begins to think of expanding his operations and his own vision begins widen. He begins to plan a larger volume of production, employs one or two persons to assist him, and begins a small or tiny industry. A rural artisan is only the starting point, out of them will emerge the new breed of entrepreneurs that can create new jobs in the villages. The process may go even further than this like poultry, piggery, dairying, and fishing etc. which are becoming more and more industrial rather than agriculture. Poultry e.g. can become a fairly big business with hundreds of birds both for the table as well as for eggs. With the extension of the sea limit of 200 miles, coastal fishing is no longer merely the occupation of fisherman but is becoming big business, as witnessed by the entry of large houses and multinations into this area. There is increasing recognition that agriculture and industrial activity in the rural areas are not

two separate sectors but form a continum; prosperity in one sector, in India, is closely dependent on the growth of the other. For increasing productivity industry can supply: improved tools, tractors, seed drills, weeders, sprayers, pesticides, fertilizers, insecticides and so on. Agricultural surpluses can be utilised for industry.

INDUSTRIAL POLICY SUPPORT

To some extent, the Industrial policy statement made by the Government on 23rd December, 1977 sought to establish such ties. The importance of the new Policy statement was not that it said anything new but that it changed the priorities from the large industry to the small and cottage industry. It declared as the fundamental policy of the government, "Whatever can be produced by small and cottage industries must only be so produced." It defined a new sector-the tiny sector-which had not only an investment ceiling [Rs 1 lakh now updated to Rs. 5 lakh] but also a locational one. It proposed the establishment of district industrial centres as the focal points for the growth of industries in the rural areas for which specific incentives would be provided. More importantly, the statement focussed attention on the lot of the small people, living in villages and small towns. It is precisely this section of the population the artisans, the handloom workers, the tanners, the carpenters, the black smith, the potters who were hither to neglected, that were sought to be provided with special attention and help.

ACHIEVEMENTS BY SMALL SCALE & VILLAGE INDUSTRY (TINY SECTOR)

The small scale industrial sector has emerged as a dynamic and vibrant component of the economy during the eighties. At the end of the Seventh Five Year Plan, it accounted for nearly 35% of gross value of output in the manufacturing sector and over 40% of the total exports from the country. It also provided employment opportunity to about 10.2 million people. Besides economy and employment this sector has provided enormous services to the community e.g. bullock cart which still accounts for 80% of the rural transportation.

INCENTIVES AND SUPPORT TO SMALL VILLAGE & TINY UNITS

The primary objective of the small scale industrial policy during Nineties is to impart more vitality and growth-impetus to the sector to enable it to contribute its mite fully to the economy particularly in terms of growth of output, employment and exports. The Government has already announced increase in the investment limit in plant and machinery of small industries, ancillary units, export-oriented units and tiny units to Rs. 60 lakh, Rs. 75 Lakh and Rs. 5.00 lakh, irrespective of location of unit. Service sub-sector is a fast growing area and apreciating the need to provide support to it, an view of its recognised potential for generating employment, all industry related service and business enterprise, with investment upto Rs. 5 lakh in fixed assets, excluding land and building, irrespective of their location are recognised as small scale industries (SSI). While the small scale sector (other than tiny enterprises) is mainly entitled to one-time benefits (like preference in land allocation, power connection and access to facilities for skill/technology upgradation), the tiny enterprises are also eligible for additional support on continuing basis, including easier access to institutional finance, priority in govt. Purchase programme and relaxation from certain provisions of labour laws.

It has also been decided to widen the scope of the National Equity Fund Scheme to cover projects upto Rs. 10 lakhs for equity support (upto 15%). Single window loan scheme has also been enlarged to cover projects upto Rs. 20 lakh with working capital margin upto Rs. 10 lakh. Composite loans under single window scheme, now available only through State financial Corporations (SFCs) and twin function state Small Industries Development Corporation (SSIDCs) would also be channelised through commercial banks. This would facilitate access to a large number of entrepreneurs. All statutes, regulations and procedures would be reviewed and modified, wherever necessary, to ensure that their operations do not militate against the interests of the small and village

enterprises. The following supports are also announced for the promotion of these sectors :

(a) FINANCIAL SUPPORT : Adequate flow of genuine credit instead of subsidised/cheap credit.

(b) BOOST TO ANCILLARISATION/SUB-CONTRACTING : Equity participation of other industrial undertaking in the SSI, not exceeding 24% of the total share holding.

(c) PROMPT PAYMENT : Seting up of factoring services through Small Industries Development Bank of India (SIDBI) networking through commercial banks.

(d) REGULATORY PROVISIONS : 'Limited Partnership Act' shall enhance the supply of risk capital and limit the financial liability of the new and non-active partner/entrepreneurs to the capital invested.

(e) INFRASTRUCTURAL FACILITIES : Scheme of Integrated Infrastructural Development (including Technological Back-up Services) with participation of State Governments and financial institutions.

(f) TECHNOLOGICAL INPUTS : Technology Development Cell (TDC) shall be set up in Small Industries Development Organisation (SIDCO) for improved productivity and competetiveness. Process-cum-product Development Centres (PPDCs) and SIDCO will interact with other industriall research and development organisation.

(g) RAW MATERIALS : Adequate and equitable distribution of indigenous and imported raw material. Based on capacity needs, Tiny/small scale units would be given preference in allocation of indigenous raw materials.

(h) PACKAGE OF INCENTIVES AND SERVICES : Proper and adequate arrangements at district level.

(i) MARKETING AND EXPORTS : Mass consumption labour intensive products through organised sector, cooperative/public sector institutions, other specialised/professional marketing agencies and consortia approach. National

Small Industries Corporation (NSIC) and Small Scale Industries Development Corporations (SSIDC) shall link for marketing. An export Development Centre (EDC) would be set up in SIDCO for augmenting export potentials.

(j) MODERNISATION: Awareness programmes for production of goods and services confering to National and Industrial standards shall be organised.

(k) QUALITY AND TESTING FACILITY: Encouragement to Industries Association for common facilities for testing and counselling. Technology Information Centre (TIC) shall provide update knowledge on technology and markets. Where non-conformity with quality and standards involve risk to human life and public health, compulsory quality control would be enforced. I.I.Ts and selected Regional/other Engineering Colleges will serve as TICs, Design and Development Centres in their respective common areas.

(l) TRAININGS: First generation entrepreneurs through entrepreneurship Development Programmes (EDPs) with industry participation (already established industry).

(m) VOCATIONAL EDUCATION: EDP would be built into the curriculum of vocational and other degree level courses.

(n) WOMEN ENTERPRISE: Support through special training programmes to women. Instead of majority of women workers, women entrepreneurs having a majority of shares and management control would be redefined as 'Women Enterprises'.

(o) BAREFOOT MANAGERS: Employment opportunities, delibrate and additonal, shall be generated suiting special requirements of Small Scale sector.

(p) SIMPLIFIED RULES: Procedures to be simplified and reduction of control of bureaucratic control with minimum paper work (less number of registers to be maintained and avoiding army of inspectors) for better concentration of entrepreneurs on production and marketing.

NEW POLICY FOR HANDLOOM, HANDICRAFT AND OTHER VILLAGE INDUSTRY

(A) HANDLOOM: Handloom sector alone contribute 30% of the total textile production in our country. There is a great need to eliminate contraints for the coverage of bulk of weavers outside the corporate-/cooperative field. Three major policies to support this sector have been announced.

(i) PROJECT PACKAGE SCHEME: Area need base project for product development, upgradation of technologies (modernisation of looms, training, better designs, dyes and chemicals) and marketing facilities to be developed.

(ii) WELFARE PACKAGE SCHEMES: Augmented number of welfare schemes and finance earmarked.

(iii) ORGANIZATION DEVELOPMENT PACKAGE: Better management system through organisation development. Expanded role of National Handloom Development Corporation (NHDC) as a nodal agency for supply of hank yarn, dyes and chemicals. Increased spinning capacity of co-operative and seed money for cotton growers spinning mills and weavers spinning mills by NHDC. Value adding and export potentials shall be tapped in this sector.

(B) HANDICRAFTS: Key areas of handicrafts are production and marketing. Considering the importance of this sector from the point of view of employment and exports an integrated development thrust, giving it necessary inputs for quality and better marketing support both internal and overseas, have been proposed. Emphasis shall be given on:

(i) CLUSTER APPROACH: Setting up of Craft Development Centres (CDCs) for area based integrated (raw materials, design, technical guidance, market support, training etc) inputs required shall be given.

(ii) SPECIAL MARKETING ASSISTANCE: Through Central and State Handicraft Corporations and Voluntary Organisations expansion of marketing infrastructure, publicity/exhibitions etc., thereby providing direct support to craft persons.

(iii) TRAINING: State Handicraft Co-

rporations, Cooperatives and Voluntary Organisations shall provide training.

(iv) EXPORTS: New marketing channels like trading companies and departmental stores.

(C) OTHER VILLAGE INDUSTRIES: The Government recognises the need to expand rural and cottage industry towards stepping up non-farm employment. Khadi & Village Industries Commission (KVIC) and State Khadi & Village Industries Boards (KVIBS) shall be strengthened for effective discharge of their responsibilities. Following thrusts shall be given in this sector:

(i) NEW MARKETING STRATEGIES: Emphasis on quality and improved marketing instead of merely dependence on rebate and subsidies.

(ii) CREDIT FLOW: Better coordination and utilization of different development schemes and agencies operating in rural areas and ensure better flow of credit through banks.

(iii) COORDINATION: Tie-up of KVI with TRYSEM and DRDA etc for weaker sections like SC/ST and women upliftment throughout the country.

(iv) INCENTIVES TO AGRO-BASED INDUSTRIES: Agro processing and food processing industries in KVI sector using appropriate technologies will be promoted utilizing locally available agriculture produce and residues to further promote employment opportunities and resource generation.

(v) FUNCTIONAL INDUSTRIAL ESTATES: These shall be established in areas with concentration of agricultural/horticultural produce.

(vi) R & D: Research & Development of KVIC sector would be strengthened by linking them with CSIR and other research organisations/institutions in the areas of production, finishing/packaging, processes, development and new tools and implements etc.

(vii) TRAINING: Programmes would be upgraded and augmented to cover the expanded list of industries under the purview of KVIC.

CONCLUSION

On a global level, the world by 2000 AD, with a overcrowded place of 7 to 8 billion, may indeed be a difficult place to live in and unless something radically different happens, the problems of survival are likely to multiply, specially in that part of world where population increase is going to be greater like India. The programme or small industry development, during all this time, has grown rapidly both in number and in quality, and has emerged as a vital sector of our country's economy and providing maximum employment opportunities next to agriculture. The next two decades will witness a much greater measure of the expansion of small industry sector.

REFERENCES

1. "Udyog Yug" Vol. 12, No. 3, Jan. 92 published by the Publicity Division, I.A.G. Deptt. of Industries, Haryana, Sector 17, Chandigarh 160017.
2. "Yojna" Vol. 35, No. 19, Oct. 91, By: Publication Division,Patiala House, New Delhi 110 001.
3. "Small Industry - The Challenge of the Eighties", By: Ram K Vepa, Pub. by: Vikas Publishing house Pvt. Ltd, Regd. Office, 5, Ansari Road, New Delhi 110002.
4. "Rural Industrialisation in a Modern Economy" by: N K Puri, pub. by: National Book Organisation (Publishers - Distributors) H- 39, Green Part Ext. New Delhi 110016.

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'The world is too much with us: Late and soon,
Getting and spending, we lay waste our powers:
Little we see in Nature that is ours:

Wordsworth

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A SIMPLE APPARATUS FOR MEASUREMENT OF EXPERIMENTAL BIOGAS PRODUCTION

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The authors has described the experimental method of measurement of small quantity of biogas production. This method is suitable for laboratory experiments. The method also describes the evaluation of methane gas.

Worldwide shortage of fossil source of energy has given impetus to the development of alternate and renewable sources of energy. One of the alternate sources proposed is the production of biogas from biomass with emphasis on its production from waste material. Biogas produced from agricultural wastes like cowdung contains 60-70% methane and the rest carbon di-oxide. The amount of methane present in the biogas determines not only its calorific value, but also its use as fuel gas. Major studies on biogas production has therefore, been concentrated on increasing the yield and enrichment of methane. In all such studies where a large number of experiments are planned with small quantity of fermenting media, an apparatus is required which not only measures small volumes of biogas produced but can also indicate if the mixture can be used as fuel gas. The production of methane gas starts after a retention time of 4-21 days (Varel et al.

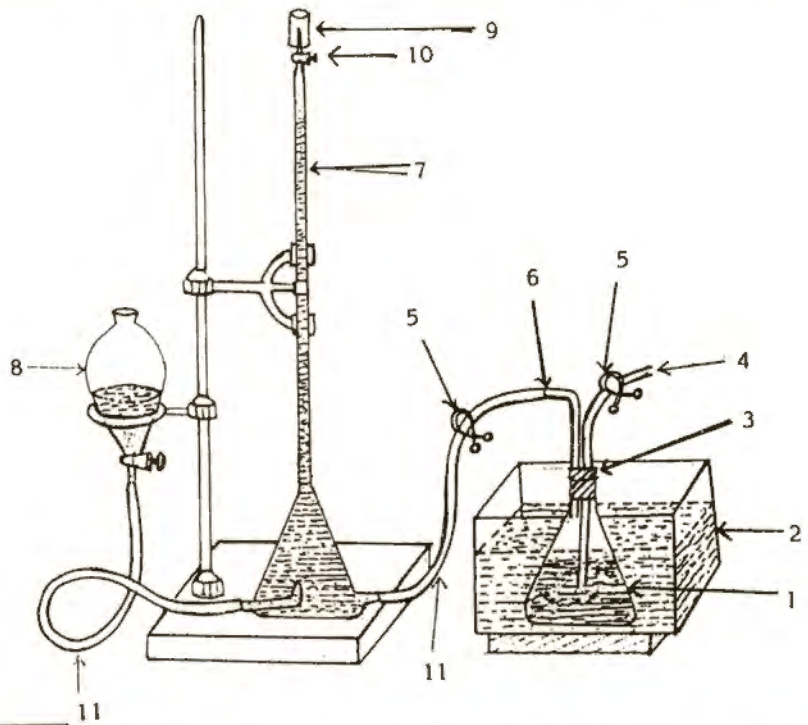
1977) depending upon factors like temperature etc. and till then there is a larger proportion of carbon dioxide in the gas mixture. A simple apparatus which can be easily assembled in any laboratory is described here.

The assembled apparatus connected to the experimental digestor is shown in figure 1. The gas collector consists of an inverted 50 ml burette fused to a 500 ml erlenmeyer flask having two outlets for making connections to the digestor and to a separating funnel for maintaining a particular pressure for measurement of the gas as shown in the figure. The connexion is made through a rubber tubing. For operating the apparatus, the gas collector and the separating funnel are filled completely with water and the pinch cock between the gas collector and the digestor being kept closed. The cowdung slurry is poured into the digestor, which for experimental purpose may consist of 1000 ml erlenmeyer flask with provision for removing the samples. The separating funnel is positioned above the level of the nozzle of burette and all air is removed from the gas collector by opening the stop cock. Bring the level of the separating funnel to the middle and then open the pinch cock connecting the digestor when sufficient pressure is developed in the digestor to start collection of the gas by displacement of water. The volume of the gas produced during certain time period can be measured directly from the burette by raising and lowering the level of separating funnel to maintain constant pressure. In order to check if the gas produced has sufficient proportion of methane for use as a fuel gas, a piece of glass tubing snuggly fitting over the nozzle and rising about an inch over the tip is placed. The seperating funnel is now raised to the level of the nozzle after closing the pinch cock between the digestor and the gas collector. The stopcock is now partly opened to permit escape of the gas with a low velocity. A burning matchstick is placed at the mouth of the glass tubing

and if the gas burns continuously it has the right proportion of methane for fuel gas. It the velocity of escaping gas is too high, the gas may not burn continouously and may give hissing noise with a wrong conclusion of the proportion of methane. It is therefore necessary to adjust the level of separating funnel to obtain the right velocity of escaping gas. By introducing a gas purger containing dilute alkali between the gas collector and the digestor, it is possible to measure the almost pure methane as CO_2 will be absorbed by the alkali. The digestor can also be placed in a water bath for studying gas production at different temperatures. Another advantage of the apparatus is that one can use a battery of unit consisting of the apparatus and the digestors to study different factors affecting the biogas production simultaneously.

REFERENCES

1. Varel V.H., Issacson, H.R. and Bryant, M.R., 1977. Thermophilic methane production from cattle wastes. Appl. Environ, Microbiol. 32, 298-307.



INDIGENOUS KNOWLEDGE : A NEW HORIZON FOR RURAL DEVELOPMENT

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Overcenturies local people have valuable Indegenous knowledge (I.K.), which has been knowingly neglected. This paper highlights the different faces of I.K., experiences of other countries and prospect for adoption in third world countries.

Plans and programmes for development are usually done at national level by Planning Commission and at state level by state planning boards without active participation of common people. But for sustainable development of rural based country like India, grass root planning is needed. Academics and planners have now felt that our planning for sustainable rural development must exploit our Indigenous Knowledge (I.K.). It provides valuable resource and locality specific information on agriculture, land and water use, and natural resource conservation (forest, mineral, life stock etc.), human health and sanitation, environmental protection, pest and fertiliser management, aquaculture etc.

Over centuries local people have their own locality specific knowledge, beliefs and practices in different fields, which can serve as a sound foundation over which the entire planning structure can rest. Those informations, datas and knowledge collected directly from the locality by themselves are generally known as I.K. This term is synonym to 'Traditional' or 'Local Knowledge'. 'Sustainable development' may be defined as the development that meets the needs of the present without compromising the ability of future generations to meet their needs as per Brundtland Commission on Environment and Development (1987).

These terminology may not be water tight but should be flexible and elastic.

I.K. systems provide the basis for local-level decision making through democratic institutions like village committee and Panchayat Systems. Here the community pinpoints its own problems, solves and seeks solutions to them in local forums, banking on indigenous information, innovative knowledge and ageold experience.

We, the Scientists, Researchers, Planners, Thinkers, Social Workers and outsiders do not feel the pulse of the local people and confidently ignore their basic ideas, views, proposals, suggestions, and solutions, thinking them outdated, unsuitable, unscientific and traditional. The knowledge derived from empirical trial and error has stood the test of time. But it is a regretable fact we have not recognised this valuable ancient wisdom till yet. It has been knowingly neglected under the cloud of civilization and modern unity.

Little of these beautiful and helpful informations have been stored. They are mostly localised and are usually transmitted orally from generation to generation.

Now it is high time that I.K. be recorded, codified and treasured by sophisticated information technolgy, which extends over a broad spectrum of human activities and natural environment. We must device some simple methods to preserve these knowledge at village level or Panchayat level so that the villagers will have easy access to these information when needed.

Srilanka has basic information on local pest Control methods. The Nepalis farmers have classified their local soil and successfully managed their fertility problem by using their own I.K. They are the eye openers to the outsiders, whose solutions have really failed. The Philipinos have participated in Crop germplasm development. In agriculture Sector I.K. rests on classification of soil and understanding claimatic conditions where farmers select their own crops and adopts local methods biofertiliser and biological pest control methods. In India small

holders having land less than two hectors have developed in the field of mixed farming, dry agriculture, biological pest control, seed improvement and selection, improving soilmoisture, trap crops, pest control by offering feed crops, grain storage at lowered oxygen level etc. The people of Kurg District in India are preserving and managing forest as 'Devera Kadu' i.e. religious forest of God's forest. In Kerala the local unemployed youths have formed a vegetable Co-operative and have conducted a detailed market study regarding the vegetables. They have collected highbreed seeds from government departments at subsidised rate. They have arranged land on lease from private land owners. The co-operative banks have offered them soft loans. They are getting good return of their products. Now those youths are self employed. Key to this success story is the sucessful adoption of I.K. at Kano, Nigeria farmers have uncovered pest control practices currently unknown to science.

Nature's regeneration of plants is slow and uncertain. As such the local villagers adopt sustainable indigenous practices and common species of plants suiting to their locality, climate and needs. Village people usually do not destroy forest. But they maintain their forest resources, as they are fully dependent on them.

We can utilise I.K. for biological and cultural diversity and resource management. The local people, their simple ideas and views are relevant even today in various fields. As such I.K. is a vital tool which offers opportunities to the local people to identify their problem, seeks solution themselves and take active part in the planning and developmental process. The participatory approaches allow local inhabitants to pinpoint their needs from their prospectives. Development will start with and build on I.K. of those local people, for whom planning is being made. Then only it will be regarded as people's planning, self-reliant, dependable and sustainable. Genuine development is to be people based which will allow local souls to play an active role and to take measure decision in shaping their all round development for

preparing the developmental blue-print. This development strategy indicates the orbit into which the economy is shot. The valuable I.K is recorded in Cadestral maps by the local villagers after a brief orientation of them by technical personnel and voluntary agency.

Resource maping, land use maping, land capability assesement maping and health and sanitation maping etc. are to be drawn on those maps, local school teacher, interested school students or knowledgeable experienced person may be engaged in the above maping process. All local useful informations and datas are plotted on these maps and where those can not be drawn, they are to be noted on separate sheets, which will be referred at the time of formulation of action plan, for the areas for which such maps are available. The local people feel secured and elevated as they take part in the planning process in the real sense. These useful informations are generally best known to the local people, having sound knowledge regarding local soil, water, crop, disease, forest, environment, agriculture, life stock etc. Besides this specialized persons of corresponding branches may also collect their datas and informations and keep them recorded. Before arriving at any decision in any facets of rural development, the maps already drawn by people can be made use of, consonant with the information available by specialists, researchers and departmental officers. In case the local information noted on the maps drawn by the people are viable, technically feasible, environmentally friendly and locally acceptable, then those should be followed forth with without hesitation. The success story of Kerala youths has prompted the R.D. Department in Govt. of India to start for UNICEF supported pilot projects for integrated drinking water and sanitation with people's participation in four blocks of India. If the above experimental programme is found to be successful then such projects could also be followed in the third world countries. Bhanjanagar block of Ganjam district of Orissa has been selected as one such block. It has been estimated that it will take at least one year

to complete the maping of the entire block. The I.K. stored in forms of maps may play a pivotal role in grass root planning process, where indegenous people are given the opportunity of planning their own developmental scheme. The rural people are steeped in a different system of knowledge and beliefs. To them the external recommendations, couched in imported scientific principles are not at all acceptable.

The pilot project in Orissa is being implemented by a reputed NGO; 'Bharat Gyan Vigyn Samiti' having a key role in spreading literacy. The above project is based on I.K. to be collected through People's participatory Approch (PPA) I.K. appears to be embeded in the meeting of traditional and modern understanding, part of which is registered and part is well understood. This new horizon is to be exploited for rural developement.

REFERENCES

1. Atte O.D., "Indigenous knowledge and local development the participatory approach" 1992.
2. Mundy Paul, Compton J. Lin, "Indigenous communicaiton and Indigenous knowledge concept and interfaces", 1992.
3. Prain Gordon, "Local Knowledge and global resources, User participation in crop germplasm research", 1992.
4. Ghimire N.P., "Indigenous methods of live stock health care in Nepal".
5. Tamang devicea, "Indigenous soil fertility management in the hills of Nepal, lesson from an east-west transect," International symposium at IIRR, Silang.
6. Thuraton H.D., "Sustainable practices for plant disease management in traditional farming systems." 1992.

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'The earth has enough for every man's need
but not for every man's greed'.

Mahatma Gandhi

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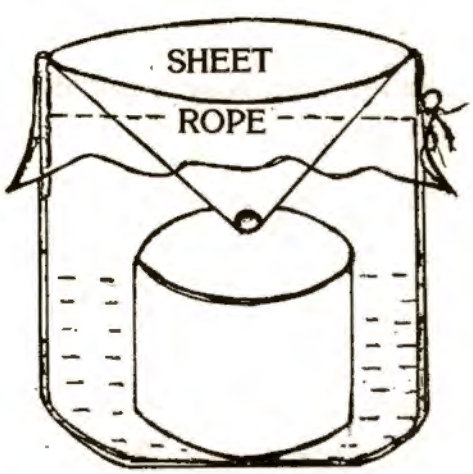
DOMESTIC STILL

REQUIREMENTS:

1. One large tub or bucket, preferably, made of metal and roughly 40 cm deep and 40 cm in top diametre.
2. One small tub or bucket of the size 20 cm x 20 cm (top diametre). Many homes will have containers about this size to suit the purpose.
3. A thin transparent plastic cloth of the size 80 cm x 80 cm (bits may be heat sealed to get the required size).
4. Sea water or brackish water.



METHOD:

The small container is placed inside the big and the water poured into the big container up to the brim of the small container. A weight is placed inside the small container to prevent it from lifting due to buoyancy. The plastic sheet is spread over the buckets (setting) and the middle portion of the sheet depressed to make the sheet sag like a funnel in the middle above the small bucket as shown in the diagram. The funnel should not touch the small bucket. When the plastic sheet takes the shape of a funnel or an inverted cone the ends of the sheet are pressed against the big container and a rope or ribbon is tied round the top end (rim) of the big container to hold the plasitc sheet in that position.

The setting is done under the open sun in the morning and left there throughout the day. The water in the larger container vaporises and in the night when the atmosphere cools down, condenses,

rolls down along the outer side of the funnel and fills the small container placed inside the big container. Every morning the condensed water is removed and the still reset with more water.

The condensed water need not be boiled. A pinch of sugar, salt, or a drop of some herbal essence may be added to the condensed water for taste and flavour. Cummin seed, basil leaf (tulsi) curry leaf, etc. may also be added.

In countries where the sun does not shine to vapourise and condense water, the following is done:

1. The sea water or brackish water is brought almost to a boiling point and poured into the still to cool and condense, (or)
2. The still is set on three stones and fuelled underneath as campers do to prepare food, (or)
3. A portable electric room heater is reflected on the still to heat the water (or)
4. All the methods explained above are combined.
5. After setting the still as shown, put it on top of the rice pot set on the stove to boil. (in the place of a lid). The steaming rice in water evaporates and condenses the sea water into the small container. In about 30 mts. about 3 glasses of water collects and for more cooking, more water is required.

This Domestic Still gives best results when :-

1. The big drum is of the size 45 cm x 45 cm.
2. The small drum is of the size 30 cm x 30 cm.
3. Placed under a tree on 4 flat stones (bricks or building blocks) 15 cm above ground level.
4. Both the drums are painted black excepting the inside of the small drum.
5. 18 or 20 mm galvanised sheet or mild steel sheet are used to make the drums (galvanised sheets are costlier).
6. A readily available full size empty petroleum drum is used.
7. When the plastic sheet takes the shape of a funnel - folds in the sheet help the water drops drip fast.
8. When 3 buckets of condensed water

is required only 3 1/2 buckets of sea water is poured.

9. It is better to have more drums when more water is required and not to increase the size of the drums. Alternatively, condensation process may be repeated 3 or 4 times.
10. Thin high density Polythene Sheet is used.

RICE POT STILL

Most of Solar Stills anywhere in the world take a long time to yield a small quantity of water, and if rows of them are built to get more water, the project becomes centralised, the cost goes up and maintenance becomes difficult and expensive.

After innovating different designs of solar stills and field testing Ryan Foundation concludes that Solar-cum-Thermal Stills, utilizing waste energy (heat), from kitchen stoves or factory boilers are the most productive, economical and suitable for the poorest of the poor. The Foundation believes that centralising a desalination plant and trying to distribute water to thousands of homes and villages scattered far and wide is not only expensive but also troublesome and the agency behind such centralised water distribution takes bribes which is a common practice in Third World Countries. Therefore, the Foundation strongly advocates house-to-house desalination of sea water. RYFO Domestic Still satisfies this need very well and it is being used in homes and villages in several countries. However, stove or boiler energy,

in some form or the other, is needed to operate of RYFO Domestic still effectively.

The RYFO Pot Still showed in the diagram here avoids additional cooking energy but utilizes the heat escaping from cooking vessels on the flaming oven. RYFO Domestic Still is simply to be mounted on top of the rice pot on the boil. In other words, the bottom of the still is used as the lid for the pot boiling the rice. The steam coming out of the pot heats the sea water, evaporates and condenses it.

When cold water is filled into the funnel shaped plastic sheet the condensation is quick and more. As the water in the funnel gets warm 2 or 3 cups of water may be removed from it and cold water added to it. Only if the funnel water is cold condensation will take place quickly, with ice, the condensation is immediate.

While cooking the rice, the Still may be lifted and put down to check if the rice has boiled and put back on top of the pot. Removing and replacing the Still this way does not reduce condensation.

Field tests have proved that a pot of rice for 4 people, if cooked for 30 mts. yields 3 tumblers of safe water. If 3 dishes are cooked the yield will be about 9 glasses. If more water is required the Still must be put directly on the stove without the cooking pot in between. The Still may be placed also on top of the glass in the middle of a solar box cooker. There is only a marginal reduction of yield on a solar box. Field tests are most encouraging.

Drinking water is no problem provided governments make sea water available for the poor in man-made sea water canals. The Rice Pot Still gives best results when :-

1. The size of the still (bigger vessel, i.e. the one into which sea or saline water is poured) is 30 cm high & 20 cm in diametre.
2. The bigger vessel is made of aluminium or stainless steel (Aluminium is slightly better, lighter and cheaper).
3. Both the vessels are painted black excepting the inner side of the small one.
4. As little sea water is poured in. For eg :

To get 4 glasses of good water only 4 1/2 glasses of sea water must be poured and to get 5 glasses, 5 1/2 glasses of sea water must be poured. Too much water takes more time to get heated for evaporation.

5. Slow fire and not flaming fire is used.
6. The small vessel is mounted on a flat stone or building block so that the already condensed water in it does not get heated and evaporate again. Heat on the small vessel gives less yield.
7. The plastic sheet takes the shape of a funnel - folds in it help the water beeds to roll down the folds and drip into the small vessel.
8. When cold water is filled into the "V" shaped funnel, ice water gives excellent and immediate results.
9. Cold water that gets warm is removed by a cup and replaced with fresh cold water.
10. It is better to have more stills when more water is required and not to increase the size of the still.

Courtsey :

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'The forest is a peculiar organism of unlimited
Kindness and benevolence that makes no demands
For its sustenance and extends generously
The products of its life activity, it affords
Protection to all beings, offering shade even
To the axeman who destroys it.

Gautama Buddha

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TRENCH LAVATORY

DESCRIPTION

Villagers consider it unhygienic to have a toilet inside the house. This is why they defecate in the open. This poses a great problem for women as they cannot go out during the day. They either have to get up much before dawn or answer the call of nature after dusk which makes them prone to dangers like snakes and insects or untoward incidents like rape.

Keeping all these problems in view, a very economical solution is the open air toilet, 'the trench lavatory'. It has the following advantages :-

— It is cheap
— Does not require any maintenance
— Requires minimum water
— Can be constructed in the backyard of the house or on the farm in very little space.
— Excreta provides a rich manure
— One does not feel suffocated inside the toilet (which is the reason why some village people avoid closed toilets).

Materials	Quantity	Size (Length & breadth)
Bamboo	4	7 ft. long
Wooden flats	4	5 ft. x 9 inches
Bamboo mat	2	7 ft. x 3 ft.

CONSTRUCTION

Dig a pit which is 7 ft. long, $1\frac{1}{2}$ft. broad and $2\frac{1}{2}$ft. deep (Fig. 1). Take 4 bamboos 7 ft. long and fix them in the ground at a distance of one feet from the pit. (Fig. 2). Place two wooden flats of $2\frac{1}{2}$ ft. length and 9 inches width over the pit with a one feet gap between them. Wrap a bamboo mat around the bamboo poles, half a feet above the ground (Fig. 2 & 3).

Build a light roof of bamboo mat sloping in such a manner that the rain water sliding down the roof does not fail inside the toilet.

PROCESS

Make a heap of the mud dug out of the pit near the toilet and cover the excreta after every use of the lavatory by throwing this mud in 4-5 handfuls or using a shovel

for this purpose. This checks the infestation by flies, mosquitoes and also foul smell. The 7-foot trench can be used for two heaps of manure. When at the fixed point the trench gets filled up. Remove the upper structure and fix on the unused trench. Cover the filled trench with soil and open it after three months for taking out the manure, rich in nitrogen. Avoid making the toilet within a radius of 20 to 30 ft. from a source of drinking water like a well.

Courtsey:
Sewagram Ashram Pratisthan,
Sewagram,
Dist. Wardha (Maharashtra)

TRENCH LAVATORY

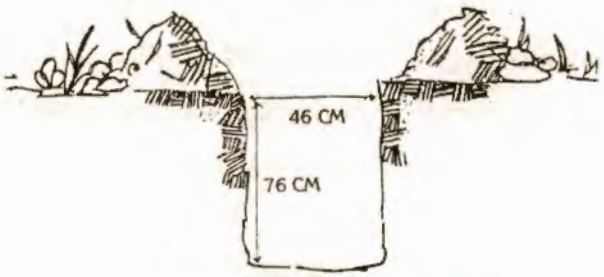

Fig. 1 : Trench of 7 length

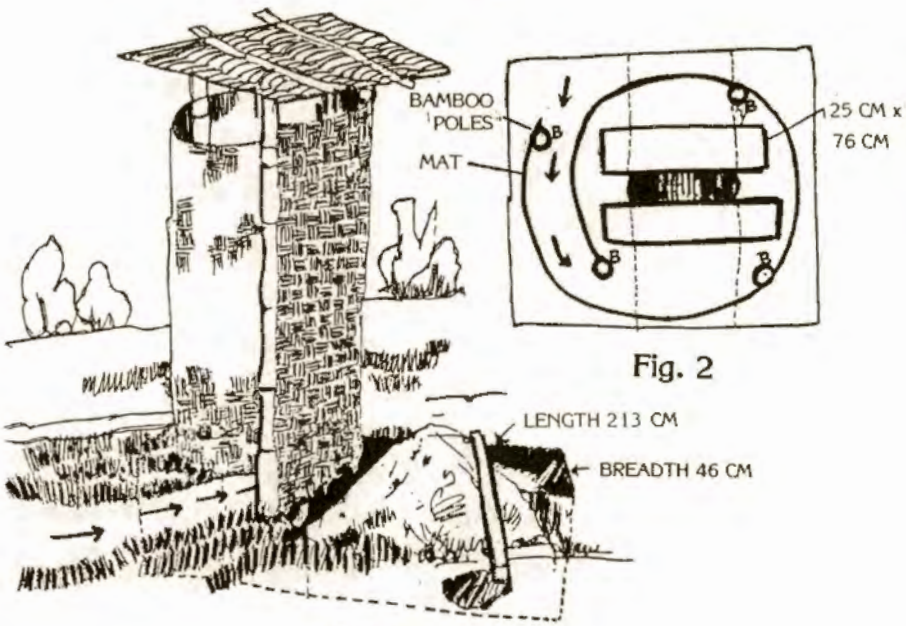

Fig. 2

Fig. 3

MAKING HOUSES WITHOUT WOOD

Think of a house without wood. Although it seems, impossible and odd such houses have been devised in Orissa by its Government in cooperation with the people-the poorest of the poor.

The houses thus built by the people themselves with no involvement of middlemen, contractor, mason or carpenter would be a strong fire-proof shelter and affordable in future.

The State Government has launched a novel housing scheme popularly known as "Kalinga kutira" for the poor with the slogan "housing for the people, of the people and by the people".

Basically, the aim of the scheme is to provide shelter to the poorest of the poor without affecting the eco-system.

The scheme has been launched in the State 11 months ago after the State Government banned the use of timber or wood in the housing activity.

He said at the Orissa pavilion in the trade fair in Pragati Maidan where the State Government has set up an exhibition depicting the housing activities in Orissa.

The scheme has a built-in repayment component so that a poor man can afford to have a fire-proof shelter without any harassment or not at the cost of his own livelihood.

The State Government has allocated Rs 3 crores for the scheme during the current financial year.

Under the scheme a building centre would be set up at panchayat level to promote cost effective technology primarily for providing fire-proof shelters to the people with limited resources.

It also provides a decentralized delivery system for the training and upgradation of skills for housing activity, extension of appropriate and affordable housing technology and shelter guidance production of building materials from industrial and agricultural wastes, opening of building material retail outlet etc.

He said a vast reservoir of forest resources is utilized for kiln purpose to burn bricks. It is regrettable that the banyan

and Peepul, trees which are considered sacred could not escape the greed of the process.

Indiscriminate use of the top soil for brick manufacturing coupled with destruction of forest for housing adds to merciless erosion, tearing millions of tonnes of soil.

SOLAR CANDLE MACHINE

The new system now popularly called as solar candle machine is handy and looks like a closed box mounted on an angle iron frame. It is a robust, weather proof and functional in all the seasons for its operation to make candles. The gross dimensions of this machine are 106 cm. x 75 cm. x 20 cm. and is easy to lift from one place to other. The solar machine needs no extra space and can be operated in the house, field or any open area where solar radiations are easily available.

The candle making by the newly developed solar machine is an appropriate technology to the villagers to provide an avenue for income generation. A capital of about Rs. 6000/- is needed to start this business and one can earn an additional monthly income of Rs. 800/- to Rs. 1500/- as a side business without disturbing the routine work. About 2 to 3 hours are sufficient for the daily candle production. Maintenance and operations of the solar candle machine are easy.

GROUP GREENING

Even as the Uttar Pradesh government faces a barrage of criticism for its otherwise lacklustre performance, it has undertaken an impressive afforestation programme that state forest secretary Mohinder Singh says is aimed at reducing environmental pollution in urban settlements. During 1993-94, 400 million saplings will be planted in selected towns in the state.

The tree species to be planted around Lucknow will be chosen for their "anti-pollution" qualities, and will include the Peepul, Bargad and Ashok. The forests will be named after the groups that plant and nurture them : Doctors will be responsible for the Chikitsa Van, children will look after the Bal Van, while journalists, teachers and lawyers will take care of the Sadbhavna Van.

The state forest department has also drawn up plans to provide the Taj Mahal with a green cover to protect it from atmospheric pollution. This will entail the

creation of a 82 ha. forest near the monument.

LOW-COST TECHNOLOGY TURNS COCONUT OIL INTO FUEL

Coconut oil can be turned into engine fuel through a new low-cost technology developed by Australian scientists.

The scientist at the Australian National University (ANU) have perfected simple technology that extracts oil of such high purity from coconut that it can be used to power diesel engines.

The key has been in finding a cheap, lowtech method of extracting coconut oil so it can be done on a household or village basis.

A vital factor in the success of his technique is the moisture content and temperature of the coconut shavings. To preserve copra, all but five percent of moisture is removed and high pressure is needed to squeeze out the oil. But the experiments showed that retaining between 9 and 13 percent moisture made oil extaining between 9 and 13 pecent moisture made oil extraction relatively simple and lifted the yield dramatically to about 60 percent.

Oil processed by ten of Australian-built devices has been tested in truck engines, outboard motors and power generators in the western Pacific nations of the Solomon Island and Vanuatu. Little engine modification was needed.

Our aim was to develop a rugged, practical method of extracting oil. It seems to be exactly what is needed. One local resort owner cancelled his order for a $ 60,000 screw press and has order 50 of our $ 200 presses instead. It's a major saving and creates local employment.

Collaboration with technician of the National Science Agency, CSIRO, and Wollongong University has produced an oil-extraction kit of low-cost items, including a pedal-powered rotary grater, a solar drier, solar oven and charcoal-and-sand filter. All these items could be made on location.

Coconut palms are superbly adapted to harsh tropical-marine environments; they live to between 60 and 80 years and produce new fruit every month, making them ideal as a sustainable resource, and while native populations and commercial entrepreneurs rely quite heavily on the coconut, it still is under-used. This will no longer be so if the Etherington technology

for transforming coconut oil into a fuel source gains widespread acceptance.

JOJOBA-BOON ARID LANDS

A hardy, ever-green shrub, jojoba grows in deserts, on rocks, and on soils which may be acidic or alkaline. It needs very little water and can easily tolerate temperature up to 122 degree fahrenheit (50 degree celsius). Once planted, it lives on for 100 to 150 years, yielding seeds which fetch Rs. 200 kilogram in the international market.

Unlike other oils, jojoba oil is liquid wax, and not fat. This quality lends jojoba oil and its derivatives to numerous uses, though the most common use remains as a base for cosmetics.

According to studies conducted by the Central Salt and Marine Chemicals Research Institute, jojoba plantation yielded an assured annual return of Rs. 50,000 per hectare from tenth year onwards.

However, in ideal conditions, the annual yield was 500 kg to 800 kg seeds per hectare after the tenth year. In the initial years, it was to 500 kg. The initial investment was Rs. 8,000 to Rs. 10,000 per hetare. However, the cost of maintenance in subsequent years was only Rs. 4,000 to Rs. 5,000 per year. Which was further reduced if a farmer himself took up cultivation.

The hydrogenated jojoba wax could be used in polishing waxes for floors and automobiles and in making candles having a long burning time. The deoiled cake was a potential cattle feed supplement after detoxification and could also be a high nitrogen content fertiliser.

In India, jojoba cultivation was first introduced in Gujarat and Orissa in 1979-80. Since then some other states have also started jojoba plantations.

HARVESTING DRINKING WATER FROM FOG

Researchers have always wondered how plants survive in the arid regions by capturing the water droplets in the fog. Chilean and Canadian researchers have perfected the techinique of milking fog. moisture for human consumption.

Scientists have turned on a water tap in the square of a seaside village in Chungungo in Chile. So what, one may ask. And why involve scientists when this could

easily have been accomplished by a junior engineer. But that wasn't any ordinary tap because Chungungo village is located in the Atacama desert in Chile known to be the driest place on earth. It does not rain for years in this region and the nearest fresh water source is about 80 kilometre from the village.

Researchers did not transport water through expensive pipelines but relied on droplets hanging in the atmosphere. Fogs, locally called camachacas, which drift in off the ocean are common over the EL Tofo ridge in the Andes. The water that flowed out of the tap was the result of seven years of research by Chilean and Canadian researchers who have learned how to draw water from the coastal mountain fog.

Researchers from the Institute of Geography at the Pontificia Universidad Catolica de Chile (PUCC) and the Corporaction Nacional Forestal, along with Dr Robert Schemenaurer of Environment Canada worked for seven years to perfect the technolgoy of harvesting water from the camanchacas.

To Dr Schemenurer, the tap turning was more than the culmination of successful geographical and meterological studies. "The applied part is where you really get your satisfaction. Working and talking with the people and also realising there are a lot of places in the world where this may turn out to be an important water supply is exhiliarating." says Schemenaurer.

Last year, the project was turned into a permanent public water supply system providing 11,000 litres of water a day for the residents of Chungungo. The village previously relied on water trucked in from 80 kilometres away.

"We have helped revive a dying village," remarked Schemenaurer, the Canadian expert who masterminded the project. Thanks to the new water supply system, new houses are coming-up in the village and people are returning back to their homes.

Schemenaurer has been researching on the subject for over a decade. Working at two field sites in Quebec, he used special instruments to collect samples of cloud water for subsequent analysis. These small fog collectors are made of vertical teflon strings. As the cloud pass over the mountains, the fog hits the fibres, forms

beads and runs down into collection bottles.

The same collectors were used to examine the quality of fog water in Chile. The ideal site for fog collection was subsequently located on the mountain of El Tofo.

The huge fog-water collectors look like oversize volley-ball nets. They are made of a locally available, double-layer polypropylene mesh. Each net is 12 metres long by four metres high and hangs two metres off the ground. The water collected from the fog runs down the nets and drips into gutters that lead into a 100,000 litres tank. A pipeline carries the water down the mountain to Chungungo.

"The only real limit is investment", says Schemenaurer. Each net costs little over US $ 200 and seventy-five such nets have been installed on the mountain to harvest water for the village. In fact, there is place for 750 such nets and the village which was one of the driest in the world can supply water to other areas.

Although seaside fog yields unpolluted water, the Chilean Rural Water Authority is adding a little chlorine as a precautionary measure.

Fog droplets are tiny : about 10 million have to accumulate on the mesh to make a single large water drop, which then runs down the mesh into a trough which eventually flows down to the water supply systme. "A square metre of mesh collects between three to four litres of water in a day." says Schemenaurer.

"The system could be applied to arid zones anywhere in the world," claims Schemenaurer. Similar projects have already been set up in Peru and Ecquador and Schemenaurer is expecting funding to behin work on harvesting fogs in Kenya, India, Yemen, Oman, Haiti and Phillippines, where despite heavy rains, mountain springs dry up in the long dry season.

"The system is likely to replace the costly desalinisation system in several desert areas." says Schemenaurer. Desalinisation technology was patented towards the close of last century and is supplying much of the drinking water needs in the Middle East. Desalinisation plants in the Middle East yield half of the world's desalinated water. But desalinated water is costly at $ 2 for 1000 litres. Couples with expensive capital and running

costs desalinisation is a costly method of getting potable water of saline sea water.

The mesh costs virtually nothing to run. But for the capital cost, which is inexpensive as compared to a desalinisation plant, there are no other costs involved.

Scientists had often pondered over the capacity of plants to capture the water droplets from fog for survival in arid regions. And they had dreamt or harvesting these droplets for supplying water in arid regions. With milking of fog in Chile, the dream has really come true.

ENERGY FROM THE HUMBLE CASTOR

Whoever imagined that Jatropha Curcas, commonly known as wild castor and nepalam and used primarily as a fencing for agricultural fields, could be a panacea for energy shortage ?

Research on this plant has revealed its immense potential. It is now even being considered a potential substitute for diesel, kerosene and LPG. Conversion of the plant extract from non-edible oil to edible oil is also being researched and could prove to be a boon for developing countries.

Realising the diverse advantages of the plant, the Andhra Pradesh Government has finalised a project to cultivate it in 2,000 acres of land in each of the five districts of Nalgonda, Mahboobnagar, Chittoor, Anantpur and Visakhapatnam. The Government proposes to take half the area from privately-owned and Government-assigned lands, while the remaining will be taken from the reserve forests.

As Jatropha can grow almost anywhere, even on gravel, sandy and saline soils, the Government is planning to plant the pilot crop in rainfed and unirrigated lands. It does not require any sepcial climate either. It is also suitable for preventing soil erosion and shifting of sand dunes.

It can in fact be chosen as the first plant to be grown on the wasteland.

Farm scientists are confident of increasing the present yields of Jatropha Curcas as there are more than 160 varieties which can be hybridised to produce high yielding variety.

With India having about 175 million

hectares of wasteland needing re-vegitation, Jatropha Curcas is being projected as the ideal plant. Wherever the Jatropha is cultivated in Andhra Pradesh a seven member committee will be constituted to oversee the effective implementation of the programme.

It is a boon to the rural agricultural poor. An acre of Jatropha plantation gives Rs. 1,000 per annumin the first year and after six years it will be Rs. 36,000. Plantation demands practically no investment and management.

Under the State Government's programme, plantations have been given to small and marginal farmers, weaker sections of society and Jatropha Farmers Committees were formed to manage the plantations.

Maharashtra was the first state to take up Jatropha plantations in a big way. It also set up Jatropha oil extract processing plants. As of now, Andhra Pradesh has no such plant.

LOW-COST TRAY TO COLLECT PAPAIN

A tray simple in structure, light by weight, easy to assemble onto a papaya trunk and low-cost has been developed at the Tamil Nadu Agricultural University, Coimbatore. It consists of a pair of rectangular frames made of three mm mild steel. A nylon or polythene sheet is fixed on the frame either by stitching or using clips.

The frame has a curved portion where a curved or flexible sheetmetal clamp fits. A canvas strap is used to hold the frames to provide a horizontal platform lined with nylon or polythene sheets on which papain is collected. Identical or symmetrical aparts of the tray are fixed to the plant by a flexible curved sheet metal clamp or fixture and a canvas strap or rope.

The tray weights only 500g and costs Rs. 20/= only compared with Rs. 250/= for the traditional one.

To collect the papain a heavy -aluminium tray is fixed using four corners. The eyes of the halves are tied with a rope to the trunk.

Papain is a powder obtained from the milky latex of immature fruits of papaya. About 480 to 600 kg of dried papain can be collected from an hectare of papaya plantation in three years. The taste and edible value of the fruit is not affected after papain extraction.

RENEWABLE SOURCES OF ENERGY

An UN-ECE Workshop on 'Renewable Source of Energy' will be held at Almeria, Spain from 3-6 May '94.

For Further Information Contact :

Mrs. Josefine Andorfer
United Nations
Economic Comision For Europe
Guergy Division
Palais Des Nations
CH-1211 Geneva 10
Switzerland

POWER GENERATION AND THE ENVIRONMENT

Conference Service Department, Institution of Mechanical Engineers, U.K. will organise a conference on "Power Generation and the Environment", at London on 15-16 June '94.

For Further Information Contact :

Julie Brown
Conference Service Department
Institution of Mechanical Engineers
1, Birdcage Walk
London SWIH 9 JJ U.K.

SOLAR COOKERS,USE AND TECHNOLOGY

Second World Conference on "Solar Cookers,Use and Technology" will be held at Universidad Nacional Heredia, Costa Rica, on 12-15 July '94.

This four-day conference will include paper presentations, discussions, workshops, and displays on all aspects of solar cookers, technology, uses and dissemination strategies. The objective of the conference include 1. Exchanging information 2. Identifying current challanges 3. Exploring opportunities for collaboration.

The conference is for researchers, environmentalists, nutritionists, engineers, appropriate technologists.

For Further Information Contact :

S. Nandwani
Seccion Energia Solar
Depto. Fiska
Universidad Nacional
P.O. 728
Hercdia,
Costa Rica

SOLAR '94

Australia and Newzealand Solar Energy Society will hold its 32nd Annual meeting with the theme "SOLAR 94" from November '30 to December 3, 1994 at Australia.

For Further Information Contact :

D.K. Prasad
SOLARCH
University of New South Wales
P.O. Box 1
Kensington, N.S.W. 2033
Australia.

ENERGY '96

Centre for Science & Technology, China, will organise an International Conference "ENERGY 96" at Beijing, on 3-7 June 1996.

For Further Information Contact :

China International Conference
Centre for Science & Technology
44, Kexueynan Nan Road,
Shuangyushu
Beijing-100086
China

★★★

'Come my friends,
'Tis not too late to seek a newer world.....
Through much is taken, much remains; and though
We are not now that strength which is old days
Moved earth and heaven, that which we are, we are;
One equal temper of heroic hearts
Made weak by time and fate, but strong in will,
To strive, to seek, to find, and not to yield.

Tennyson, Ulysses

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GUIDE TO PRACTICAL PROJECT APPRAISAL

The primary concern of the Guidelines for Project Evaluation upon which this book is based, was the lack of satisfactory method of evaluating the economic and social benefits and costs of projects in developing countries.

The present book is not concerned only with the efficiency of the use of resources, however, or with maximizing the growth of the gross national product it is equally concerned with the inequities of income distribution that prevail in the developing countries. A major contribution of the Guidelines to the literature of economic project evaluation is its emphasis on investment decisions that enhance the equity of development.

The method of project appraisal in this Guidelines has been divided into five stages in nine chapters. Chapter one describes only Background and Scope of the present guidebook. Chapter two is on the first stage of the method of the project appraisal, i.e. Calculation of financial profitability at market prices. Stage two shadow pricing of resources to obtain the net benefit at economic (efficiency) prices has been described in the chapter three and four. Chapter five reveals the measurement of the distribution impact. Stage three and four-Adjustment for the project's impact on savings and investment, and adjustment for the project's impact of income distribution are described in the chapter six and seven. Chapter eight is the last and final stage of the practical project appraisal. Adjustment for the project's production or use of goods such as luxury consumer goods and basic needs whose social values are less than or greater than their economic values. The last chapter-Nine is Project Summary Matrix, followed by Annexeure's and figures.

The primary focus of this Guideline is on the economic and social benefit cost analysis of projects. The text is geared to the needs of analysts trained in economics and participating in training workshops and seminars on project evaluation. Present guidelines is also very much useful for project coordinators and planners etc.

"Guide to Practical Project Appraisal" Published by Oxford & IBH Publishing Co.

Pvt. Ltd., New Delhi, pp 121, English.

NEW TRENDS IN INDIAN INDUSTRIES

Degree of industrialisation is considered to be the index of social and economic development. During the last four decades of planned economy, with a high degree of industrialisation, India is marching ahead in all spheres and it is no wonder that India has emerged as one of the most industrialised power of the world in terms of both quantity and quality. The different five year plan periods saw the expansion and diversification of the industrial Sector with establishment of new units in existing fields as well as setting us of new ventures for increasing over all productivity in industry. There is actually dearth of such type of treatises which presents and evaluates the progress and problems of industrial sector of Indian economy. The book in two volumes, is an attempt to fulfill this requirement. It presents a host of distinguished academicians and Scholars from various parts of the country on different aspects of Indian Industry. Both volumes covers a wide range of topics like pattern of industrialisaton in India, evaluation of various industrial policies, industrial sickness, and other various aspects of Indian industry. The book is very much useful for policy makers and researchers concerned with policy and performance of industrial sector in India.

"New Trends in Indian Industry" in two volumes, by J. S. Mathur, Published by Chugh Publications, Allahabad English, Rs. 950/- (set of 2 volumes)

ROLE OF NATIONALISED BANKS IN THE DEVELOPMENT OF SMALL SCALE INDUSTRIES

This book emphasises on role of Nationalised Banks in the development of small scale Industries. The Small Scale industrial sector plays a vital role in Indian economy in terms of social transformation & employment, Govt. of India is encouraging them to promote small scale industries.

The important aspects of small industrial unit is its high incidence of sickness, as they face a number of financial technical & managerial problems. Their

internal resources are so small, that there is no surplus amount to be spent during sick period. They do not get adequate amount of loans from Nationalised Banks and other financial institutions set for assisting them.

Nationalised banks have followed a policy of systematic banks expansion designed to achieve a progressive reduction in regional imbalances. Present book is based on a study, conducted at Patna, a predominatly agricultural district of Bihar State in India. But it is one of the most backward district in Bihar in regard to the setting up large as well as small scale industries. In this connection special emphasis has been laid on the expansion of banking facilities promoting small scale industries. The book is divided into six chapters. Chapter one describes about the definition, Role, Problems and Pattern of Small Scale Industries. Chapter two and three is on Industries Potentialities and Growth of Small Scale Industries. Chapter Four on Finance for Small Scale Industries, gives the detail of Types and Resources of Finance. Its also discuss the procedure of lending by banks. Chapter five described on Nationalised Banks and finance for SSI gives the detailed schemes of different lead banks with relevant data. Conclusion and suggestions are also given in the last (sixth) chapter. "Role of Nationalised Banks in the Development of Small Scale Industries" by M.A. Hasnat, publised by Classical Publishing Company, New Delhi, P. - 174 English, Rs. 200/-.

★★★

'More than 50 percent of the world's annual wood production is utilized as fuel and of this, 90 percent is used in the developing world.

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NOTE FOR THE GUIDANCE OF AUTHORS :

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

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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.
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