Modernization of Traditional Pottery

M. Lalithambika

IRTC Monograph
Integrated Rural Technology Centre
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Integrated Rural Technology Centre
Mundur, Palakkad-678592
Email: mail@irtc.org.in
Tel: 0491 - 283 2324 Mob: 9446509414

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Preface

It is with a sense of satisfaction that this monograph is brought out which is a record of the work carried out by IRTC in the field of Traditional Pottery during the last 15 years. Needless to say that it is the whole-hearted support and financial help from the different State and Central Govt. Agencies which enabled the continuity of this program. The projects undertaken during this period are :

1. "Techno-Socio-Economic survey of the living and working conditions of the traditional potter communities of Kerala" (sponsor: Centre for Development Studies, Trivandrum).
2. "Value-addition of terracotta materials by modernization of techniques and introduction of innovative products" (sponsor: Department of Science and Technology, Govt. of India).
3. "Decorative pottery as an income generating activity for the weaker sections of the society" (sponsor: DST., Govt. of India).
4. "Setting up a rural industries service centre (RISC) at IRTC for pottery" (sponsor: Khadi and Village Industries Commission (KVIC) Govt. of India)
5. "Revamping of traditional pottery" (as a part of core support program sponsor: DST., Govt. of India)
6. "Micro potter cluster development at Peravoor, Kannur". (Sponsor: NABARD, Govt. of India)

The span of activities included fabrication and popularisation of drudgery removing equipments like clay-grinding and shaping machines (pugmill and motorised potter's wheel), introduction of innovative products/techniques like decoupage, glazing, ornament making, mural art, slip casting, smoke firing and also development of microwavable terracotta for cooking applications. Cluster development work was another useful and productive activity.

Extensive trainings in the above areas created awareness and motivation to the artisans. For Decorated Pottery (Decoupage) a Self Help Group (SHG) Chithrakala Swayam Sahaya Sangham started functioning in the IRTC campus. A grand sales outlet for pottery items "Gramakala" was opened at Puthupariyaram, Palakkad.

It is worth mentioning that the above activities have rejuvenated the pottery artisans of the region and now they realise that it is not a profession of low social status but it is a technical skill of high order generating employment and improving the living standards of the artisans.

Dr. N.K.Sasidharan Pillai
Director

CHAPTER-I

INTRODUCTION

Potters were the first engineers in the history of human civilization. They were the first group to be withdrawn from food production to get engaged in a full time profession. This was necessitated because the production of earthenware for cooking and storage of grains was a specialised task needing a lot of skill and long term training. Potter's wheel was a momentous invention ranking along with the mastery over fire which influenced the course of human development.

In spite of its utility in the past the traditional potters constitute some of the poorest sections of the society all over india ,including Kerala. They live in colonies but are scattered all over the State. They are skilled, but their skills are out dated and lack relevence to the current demands. There have been tremendous progress in other areas of ceramics like porcelain ceramics, structural ceramics,refractory ceramics and so on but the traditional ceramics was hardly benefited from these. No significant R & D had gone into this area. Till the year 2000 no reliable studies were there on socio -economic status or the technical problems faced by traditional potters in their production work. Many pottery workers were leaving this profession to work as daily-wage workers in agriculture and construction based activies. The traditional pottery area was facing a crisis showing a downward trend.

During this period a joint project "Techno-Socio-Economic Survey of the Living and Working Conditions of the Traditional Potter Communities of Kerala" was taken up jointly by Integrated Rural Technology Centre (IRTC), Mundur, Palakkad and Regional Research Laboratory (presently NIIST.), Trivandrum with the financial support from Centre for Development Studies, Trivandrum under the Kerala Research Program on Local Level Development (KRPLLD).

The objectives of this project were:

a) To identify the traditional potter communities of Kerala to make an assessment of their socio- economic status.
b) To make an evaluation of the raw material used by them
c) To address the problems faced by the potter groups and
d) To help them aquire skills in the value addition of the finished products

The methodologies adopted to achieve the above objectives included personal interviews with the leaders of District level and State level Potters'

Associations and group interviews with several potter groups in each district. In total 83 groups were interviewed all over Kerala. Group interviews were followed by the survey of the households and also the clusters. 224 households from 58 groups in the districts were taken up as part of this program.(Annexure 1-3).These interviews helped to identify the location, specific problems, details of the living and working conditions of the potter communities of Kerala, the type of products developed by them and the marketing strategies adopted by them.

The information collected during the survey included A) district wise distribution of potter clusters in Kerala, B) the details on their communities i.e. different sects among them C) their habitation pattern D) their educational and socio-economic status and E) their technology status. A brief description about these is given below.

A) Districtwise distribution of potter clusters in Kerala (Number within brackets indicates the number of households) :

Thiruvananthapuram:Thiruvananthapuram (23), Neyyattinkara (20), Nedumangad (50), Attingal (40), Nemom (10), Pallichal (2), Kilimanur (50), Pulimath (10), Kazhakoottam (15), Vattiyurkkavu (5), Vembayam (50), Nandiyode (10), Aryanad (10), Amboori (5), Parassala (50).

Kollam: Velinallur (10), Ilamad (1), Poruvazhi (3), Mailam (1), Kulakkada (4)
Pathanamthitta: Kadambanad (3), Ezhamkulam (8), Kadapra (1)
Alappuzha: Thiruvanvand ur (9), Muttar (40), Thalavadi (2)
Kottayam: Ettumanur (15), Aarpookara (9), Thalayolaparambu (5), Vellur (17), Udayanapuram (16), Thalayazham (3), Thiruvarppu (9)
Idukki : Thodupuzha (4), Manarkkad (1)

Eranakulam : Thrippunithura (20), Kochi (2), Kothamangalam (3), Kaladi (3), Manjapra (5), Sreemoolanagaram (10), Neeleswaram (4), Karumallur (15), Varappuzha (5), Mazhuvannur (4), Vadavukode-puthenkurisu (8), Aikkaranad (4), Valakom (7), Aayavana (10), Kizhmad (35), Vazhakkulam (12), Cheranallur (2), Kottuvalli (10), Nedumbasseri (4), Parakkadavu (1), Ramamangalam (5), Piravam (2), Thiruvankulam (6), Mudakkuzha (7)

Thrissur : Velur (23), Erumapetty (19), Mundathikode (2), Varavur (6), Mullurkkara (10), Kondazhi (28), Pazhayannur (16), Panjal (14), Vallatholnagar (13), Chelakkara (3), Nadathara (20), Madakkathara (12), Vilvattam (15), Nenmanikkara (50), Kodakara (20), Puthukkad (8), Choondal (4), Kandanisseri

(3), Aarthat (5), Aalur (20), Kolazhi (20), Cherppu (10), Ayinisseri (4), Thanniam (20), Manalur (10), Venkidangu (1), Vellangallur (4), Thrissur (3), Nattika (7), Vadanapalli (2), Porathisseri (6), Kadukutti (5), Mala (4).

Palakkad : Kavasseri (80), Puthukkode (30), Vadakkancheri (13), Tharur (21), Kizhakkencheri (10), Vandazhi (20), Erimayur (5), Kottayi (40), Mathur (1), Kuzhalmannam (25), Peringottukurissi (25), Kuthanur (10), Thenkurussi (10), Peruvemba (3), Akathethara (18), Puthusseri (4), Malampuzha (3), Kozhinjampara (15), Eruthe mpathi (1), Nalleppilli (3), Pattancheri (3), Perumatti (3), Melarkode (22), Nenmara (3), Elavancheri (11), Muthalamada (1), Puthunagaram (2), Pattancheri (3), Perumatti (3), Melarkode (22), Nenmara (30),Elavancheri (11), Muthalamada (1), Puthunagaram (2), Koduvayur (10), Kollankode (15), Shornur (55), Ottappalam (7), Chittur (4), Pirayiri (18), Parali (50), Koppam (8), Kanjirappuzha (10), Mannarkkad (10), Lakkidiperur (22), Mankara (6), Pattambi (10).

Malappuram :Areekode (25), Cheekode (7), Kavannur (2), Vazhakkad (10), Vazhayur (4), Elamkulam :(8), Melattur (8), Irumbliam (14), Nilambur (25), Edavanna (17), Manjeri (2), Pulamanthol (12), Alipparamba (8),

Kozhikkode :Kozhikode (3), Vadakara (12), Peruvayal (10), Karasseri (5), Mavur (4), Kunnamangalam (13), Chathamangalam (18), Ramanattukara (20), Olavanna (20), Koduvalli (6), Puthuppadi (4), Koothali (3), Changaroth(2), Perambra (2), Ulliyeri (5),Panangad (2),Kakkodi (30).

Wayanad :Meenangadi (15), Pulpalli (6), Sulthanbatheri (50), Nenmeni (12), Noolpuzha (3),Ambalavayal (13), Muttil (7), Meppadi (22), Kaniambatta (7), Thariode (30), Padinjarethara (10), Vellamunda (10), Thavinjal (10), Thondarnad (2), Thiruvelli (2), Panamaram (36), Kalpetta (4).

Kannur : Kannapuram (40), Narath (3), Cherukunnu (40), Pattam (6), Pariyaram (4), Payam (4), Kizhur-Chavasseri (7), Kizhallur (9), Kolayad (4), Chittariparambu (2), Ezhom (3), Thaliparambu (13), Koothuparambu (2)

Kasaragod :Madikkai (60), Pullurperia (10), Kodombelur (7), Pallikkara (10), Bendadukka (10), Muliar (10), Chenkala (13)

The survey showed that all the 14 districts have potters' house holds. Palakkad and Trichur districts have the maximum numbers, followed by Trivandrum and Ernakulam districts.

B) Community details:

It was found that potters belong to several sub castes. Kumbharan, Kusava, Adi Andhra, Tamil cultured Kumbharan, Mannudayan, Kulala, Anthur Nair, Andhra Nair, Velan, Pandy Velan, Odan and Oorali Kumbharan are the 12 communities engaged in pottery work in Kerala. They are all migrants from Karnataka, Tamil Nadu and Andhra Pradesh. They speak a separate dialect, but it does not have a script.

C) Habitation pattern:

Kerala potters usually live in settlements in the interior of villages. Each settlement is of a particular potter community. Members of two or more communities were never found to be sharing the same settlement. In each settlement there will be a few kilns which are used by all of them irrespective of their ownership. The worksite is mostly located adjacent to their homes. In several places the interior of the houses are also used to keep the pots either baked or wet. In rare cases a few potters were found living in their kiln shed itself.

Most of the potter's settlements have a shrine or temple which is common to all families. They worship Goddess Mariamman or God Kuppuswamy. A male member from their own community functions as the priest.

D) Educational, Social and Economic Status:

It was noticed that the potters are educationally and economically very backward irrespective of their place of residence. They are considered more backward among the "Other Backward Communities". One of the reasons for their educational backwardness is said to be child labour which prevented the children from going to school. Our survey indicated that in the 50–60 age group 36.7% are illiterates, 51.7 % are school drop outs. Only 6.7% reached high school. Among the youngsters the situation is different. 49.2% reached high school and 9.12% up to PDC and 2.11% got graduated. But it is far below the state/ national average for other communities.

Social status of potter communities is very low in comparison with other backward communities. Professionals are rare in their communities. Persons employed in Govt. Sector or in organised Private Sector was also very low.

Very few have other sources of income like government or private employment or agricultural land for cultivation. Their

Slicing the clay with cutting wire

Slicing the clay with curved knife

Hand pugging after removing foreign particles to make the clay uniform

earning levels are very low. The nature of this profession is such that they can never have assured daily earnings.

Leg pugging to make the clay uniform

E) Technology status :

In the traditional pottery work, there are three inportant aspects of work a) Mixing the clay to make a homogeneous mass (pugging), b) shaping of articles (throwing on the wheel) and c) firing the articles in a chulah or kiln.

In all the three areas the techniques they were using, were quite primitive. Some description is given below regarding these.

a. Pugging (Homogenising) of clay

For any industry to survive smoothly raw material availability is extremely important. Nearly 50 years back red clay was available in plenty in the river banks. Potters could collect it free of charge and even from private lands they could get it at very low rates. But the situation has changed. The booming building industry took ownership of the rich clay bearing areas to produce bricks and tiles. Potters had to be satisfied with second quality clay. The clay will be containing roots of plants, pieces of shells, sand pebbles etc. In order to remove these, the wet clay heap will be sliced with a curved knife or a stretched wire and the above will be hand picked and then hand/ leg pugged to make it uniform. This work is very laborious.The pictures below indicate how clay is made of uniform quality by hand pugging and leg pugging after removing the impurities.

Shaping of pot using manual potter's wheel

If some foreign materials still remain in the raw material it can cause the breakage of the final products.

b. Shaping of clay:

Most of the potters even today are working with manual potter's wheels as shown in the figure. Here the artisan has to stand or sit on the floor for shaping the vessels. So the work becomes very tiresome.Moreover one person alone cannot do it as he needs the help of another person to keep the wheel rotating.

c. Firing in chulahs/kilns:

In the country kilns breakage can be caused by lack of proper skill in placing the pots inside the kilns. Lack of uniform heat distribution inside the kiln and quality of clay, especially the presence of foreign matters in the clay (stones and shells) can also cause breakage.

During our work we realised that the following are some of the problems faced by the potters.

- Scarcity of first quality raw material and primitive processing techniques
- High cost of production due to high cost of raw material and cost of fire wood.
- Lack of demand for products
- Lack of daily earnings
- Perceived inferior status of their profession.
- Inflow of pots from the neighbouring state affecting the internal market and profit.

In order to find out the quality of the raw materials used across the State, clay samples were taken from around 60 locations from 14 districts. The locations are indicated in the table below (a). All these samples were subjected to physical and mineralogical analysis. This part of the work was carried out at Regional Research Laboratory (CSIR) (presently NIIST), Trivandrum. (Please see the tables b1 & b2).

Table a: Clusters from where samples have been collected

Trivan-drum	Kollam	Pathanam thitta	Alleppey	Kottayam	Erna kulam	Trichur
Pamamcode	Kalavayal		Thalavadi	Chengalam	Karumallur	Chittissery
Pullamala	Poruvazhi	Valanjavattom	Kallissery	Kottachira	Eroor	Madakkath-ara
Mudavan-mugal	Anthaman	Thuvayur (South)	Thiramal-likara	Vaikaprayar	Enathu	Karamukku
Melamcode					Muthirakkad	Vilpadam
Thozhukkal					Ezhipram	Nadathara, Panjal,
Amaravila						Villadam

Palakkad	Kozhikkode	Malappuram	Wayanad	Kasargode	Kannur
Pulinelly		Elamkulam	Alamkandi	Paika	Moothammal
Parli-Thenur		Aruvakkode-1	Kanacheri	Punnapalam	Paravur
Akathethara	AKG Colony	Aruvakkode-II	Madiyur Kuni	Erikkulam	Thrichambaram
Kodakkattuparambu	Olavanna	Melettoor	Nadavayyal	Kayamkulam	
Melarcode	Nandiyar Kunnu (Koothali)	Mavoor	Attakandi		
Kuzhalmannam					
Pilappally					
Padoor					
Thirunellaya					
Nadathara					
Kondazhi					

Table b1: Physical characteristics of clays from Palakkad District

Sl. No.	Sample location	Grit (%)	Fines (%)	Water of Plasticity (%)	Dry linear shrinkage (%)	Fired linear shrinkage (%)	Water absorption after firing (%)	Cold crushing strength (kg/cm2)
1	Pulinellly	4.1	95.9	37.39	11.62	1.14	14.14	225.80
2	Parali	11.4	88.6	34.78	11.0	12.75	17.80	180.17
3	Akathethara	26.2	73.8	38.40	8.16	10.84	20.80	237.30
4	Vadakkenchery	11.7	88.3	53.94	11.39	1.09	25.03	252.01
5	Melarcode	17.4	82.67	29.88	9.73	1.07	12.20	234.65
6	Kuzhamannam	11.75	88.25	36.45	11.39	1.07	14.43	197.27
7	Pilapally	11.82	88.18	32.55	9.72	1.10	12.12	146.81
8	Padoor	17.28	82.72	27.19	12.17	1.16	16.78	218.50
9	Tirunellaya	9.88	90.12	34.71	9.73	0.98	6.89	272.22

Observation: The grit content varies significantly. The grit content of the sample from Pulinelly is quite low (4.1%), whereas, the clay used in Akathethara Panchayath contained a high amount of grit. This indicates the inconsistency of the raw material used. Further, sample from Vadakkenchery indicated a plasticity of 53.94%, which was the highest among the samples of various Panchayaths of Palakkad District. The water absorption after firing showed very low value which indicated the good sinterability of the products. CCS which is a measure of the strength of the products also was quite high.

Table b2: Physical characteristics of clays from Thiruvananthapuram District.

Sl. No.	Sample location	Grit (%)	Fines (%)	Water of Plasticity (%)	Dry linear shrinkage (%)	Fired linear shrinkage (%)	Water absorption after firing (%)	Cold crushing strength (kg/cm2)
1	Pamamcode I	19.1	79.9	40.6	8.66	10.33	17.5	215.61
2	Pamamcode II	22.9	77.1	31.9	7	8.88	16.5	232.44
3	Mudavan mugal	24.2	75.8	31.6	6.66	8.5	21.2	188.28
4	Melamcode	22.2	77.8	39.4	7.33	9.18	22.3	157.03
5	Thozhukkal	14.5	85.5	34.5	6.83	9.1	15.42	203.54
6	Amaravila	23.4	76.6	26.14	7.62	8.5	15.82	196.42

Observation: Of the six samples analysed, the sample from Thozhukkal looks to be the best. This contains a grit content of only around 15 %. The percentage of fines is around 85, which indicates that the clay is very good for high quality terracotta materials.

Action plan and interventions

The above study revealed the basic problems confronting the traditional pottery sector in Kerala. The community lives in very difficult circumstances. The pottery trade is facing severe problems. The raw material availability is threatened and the quality is uncertain. The processing and production technology is primitive, laborious and involves drudgery. The products are traditional and lack current relevance. The marketing method is primitive and non-remunerative. Intervention in all these areas is required if the socio-economic conditions of the potters are to be improved. Hence the following action plan was conceived.

1. Technology

Clay processing is done manually and it involves considerable drudgery. This part is often left to the women. Hence it is important to mechanize this process with the use of pugging machines.

"Throwing" is usually done manually, and sometimes using manually operated wheels. Women are not allowed to work on the wheels. Even though 'electric wheels' have been introduced, they have not become popular. Electric wheels are also not easily available. These have to be popularized. The potters have to be trained.

2. Product diversification

The traditional products, viz., pots and pans are not in much demand. New products have to be developed. Decorative pottery has great scope, but the traditional potters have no knowledge of them. Product design and training are needed.

3. Marketing

The traditional marketing mode of carrying head loads, is out dated. Sales from emporia and exhibitions are feasible. Modern social media can be used for publicity. Potters need assistance and support for marketing.

4. Government schemes.

There are various schemes introduced by the Central and State Governments for the upliftment of traditional artisans. Potters are not even aware of them. Potters need assistance to take advantage of these opportunities.

How IRTC Intervened

Based on the above observations IRTC decided to tackle the two pressing problems of pugging and shaping of clay by a) Introducing machine pugging to make the raw material uniform and workable to avoid drudgery b) Introducing mechanisation in manual potter's wheels i.e, by fabricating motorised potter's wheels.

Both these were aimed at reducing human drudgery and making the pottery craft more worker – friendly.

To achieve the first objective a pugmill (1 ton/day) was purchased from M/S. Kairali Foundry, Trichur. This was installed at IRTC.

Pugmill installed at IRTC capacity : 1 ton/day, Power – 10 HP

Raw material i.e., clay was collected from places like Pazhampalakode, Yakkara, Ampad and Vallikode in Palakkad Dist. Pugging was done at IRTC to start with and the pugged clay was delivered at potter's door step. The beneficiaries were charged 50 paise/Kg of pugged clay. Initially they were reluctant to pay this on the ground that they can't afford it. When it was explained to them that for a pot weighing around 1.5 kg, the money they are spending for the raw material is only less than a rupee, they realised the advantage of getting pugged clay, as the raw material cost is only around one tenth of the finished product.

The figure below shows the first motorised potter's wheel installed in Palakkad Dist.

Shri. Natarajan operating the motorised wheel

Specifications:

Motor	: 0.5 HP single phase
Speed	: 160 RPM (Max)
Top cover	: Water proof plywood
Turntable dia	: 400 mm
Clay load	: 40 kg
Fly wheel	: cast iron with holes

To achieve the second objective a motorised potter's wheel was fabricated at M/S. Kelachanda Industries, Trivandrum which was transported to Palakkad. During our survey we could find that the potters of Pulinelly, Kottayi, Palakkad are quite receptive to new ideas and hence the motorised wheel

was installed at Pulinelly for demostration purposes. Shri. Natarajan, a senior potter from Pulinelly extended the required facilities (housing area and electrical requirements).

Shri. Sivan demonstating the operation of motorised potter's wheel

Shri. C. Pampasuthan, Ward member, Kottayi Grama Panchayath, addressing the potters

We took the help of Mr. Sivan who was working at Gandhi Smaraka Nidhi pottery unit, Thozhukkal, Neyyattinkara, Trivandrum, to give training in the operation of motorised potter's wheel to potters of Pulinelly. The training continued for 10 days. Today the potters of this cluster are quite happy to use motorised wheel as it increased their productivity and reduced the drudgery.

After the training, potters of Pulinelly did not look back. They took bank loans and entrusted IRTC to fabricate and supply electric wheels for them. This was the begining of inroducing mechanization in potter colonies in Palakkad District.

Inorder to improve the low level of skill of the potters and thereby improve their self confidence and earning capacity, IRTC has conducted a series of training programmes for the benefit of the potters.

CHAPTER II

Modernization of techniques and introduction of innovative products

IRTC interventions

The first task was to modernize the processing and production technology. In other words, mechanical pugging and the use of electric wheels were to be encouraged. IRTC approached the Department of Science and Technology, Govt. of India for financial support to launch a program on modernization of the existing machineries to make potter's work easier, attractive and also to hand hold them for making innovative products.

The work involved:

a) Fabrication of energy efficient motorised potters wheels.
b) Fabrication of mini pugmill which can grind upto 50 kg of clay per hour.
c) Introduction of Decoupage, glazing, ornament making and mural art as diversification work.
d) Dissemination of the above activities.

As the first step, we collected all the available models from South India

1. Sakthi wheel from Centre for Appropriate Technology, Ramavarmapuram, Nagarcoil, Tamil Nadu.
2. Shaila wheel from Ichalkaranji, Maharashtra and
3. Potter's wheel (no brand name) from M/S. Kelachandra Industries, Trivandrum.

   Improving upon the available models in the market, IRTC fabricated a machine with continuous speed variation and limit switch facility. This has lower power consumption compared to the other models in market.

Specifications : Motor-0.5 HP, single phase
Speed of wheel : 160 RPM (Max.)
Auto switching system (saves energy upto 30%)
Top cover with water proof plywood
Turntable dia : 460 mm
Clay load : 50 kg

Motorised potter's wheel developed at IRTC

Because of the user frindly features of the wheel fabricated at IRTC many potters have come forward to purchase this machine.

Today around 100 potter's wheels have been fabricated and distributed from IRTC with the help of DST and KVIC subsidy schemes.

Under the DST project IRTC started distribution of pugged clay to the potters at their work site as it was one of the objectives of the project. Pugging was done at IRTC using the pugmill (1 ton per day capacity). Pugged clay distributed to the potter colonies during the project period is indicated below.

Year	Amount of clay distributed (tons)
2005 – 2006	10
2006 – 2007	25
2007 – 2008	48

The demand, thus, definitely showed a positive trend and now they are very much aware of the advantages of pugged clay and also they are ready to purchase mini pugmills if IRTC could fabricate the same. Because of their interest IRTC has started fabricating mini pugmills and the potters were trying to get it through panchayath assistance. The machine can pug 1 kg of clay per minute and three consecutive pugging will make the clay absolutely fine for shaping.

Mini Pugmill fabricated at IRTC

Specifications:

Geared single phase motor : 0.75 HP

Capacity : 1 kg/min.

Since potters have realised the advantage of mechanised wheels we have received some group orders for potter's wheel during 2000-2005

Name of the colony/agency	No. of wheels Purchased
Pulinelly potter colony, Palakkad	17
Khadi & Village industries Board, Kozhikkode	5
Vaniyamkulam panchayath, Palakkad	3

List of Pottery artisans who received potters wheel/pugmill under the KVIC subsidy scheme

1. Subramanyan. P. K, Paruthippully, Palakkad.
2. Thankamani. A, Kavassery, Palakkad.
3. Rajakumaran. A, Padur, Palakkad.
4. Alagiri. P. K, Paruthippully, Palakkad.
5. Ramesh. P, Kuthanur, Palakkad.
6. Mohanesh. M, Thirunellaya, Palakkad.
7. Murukesan. C, Kottayi, Palakkad.
8. Subramanya. K, Kottayi, Palakkad.
9. Chithrangathan. R, Kottayi, Palakkad.
10. Lakshmanan. R, Kottayi, Palakkad.
11. Radhakrishnan. T, Kottayi, Palakkad.
12. Devadasan. G, Kavassery, Palakkad.
13. Unnikrishnan, Kottayi, Palakkad.
14. Manikantan. N, Kottayi, Palakkad.
15. Velayudhan. C, Kottayi, Palakkad.
16. Sreekumaran. K, Kottayi, Palakkad.
17. Kumaran. K, Kavassery, Palakkad.
18. Manikantan. C, Paruthippully, Palakkad.
19. Gopalakrishnan, Vaniyamkulam, Palakkad.
20. Krishnankutty, Pazhampalakkode, Palakkad.
21. Rajan. C, Padur, Palakkad.
22. Kasumani. M, Padur, Palakkad.
23. Krishnankutty, Kuzhalmannam, Palakkad.
24. Selvarajan, T., Kuzhalmannam, Palakkad.
25. Krishnan, Pilappully, Palakkad.
26. Subramanyan. K, Pilappully, Palakkad.
27. Mahesh. K, Vadakkanchery, Palakkad.
28. Manikandan. K, Kavassery, Palakkad.
29. Krishnan, Kavassery, Palakkad.
30. Thankarajan, Pazhampalakkode, Palakkad.

Hon. Minister Shri. Kadannappally Ramachandran inaugurating the potter's wheel distribution function

Skill development program

List of Pottery artisans who received potters wheel/pugmill under the DST subsidy scheme

1. Swaminathan, Pulinelly, Palakkad
2. Chithrangathan, Pulinelly, Palakkad.
3. Govindan, Padur, Palakkad.
4. Chellan, Trivandrum.
5. Narayanan, Parali, Palakkad.
6. Kannan, Parali, Palakkad.
7. Saradha, Thenur, Palakkad.
8. Babu, Alathur, Palakkad.
9. Velayudhan Narasimhan, Arupuzha, Palakkad.
10. Valliyamma, Thenur, Palakkad.
11. Thankamma, Arupuzha, Palakkad.
12. Sajitha, Neyattinkara, Trivandrum.
13. Ponnamma, Arupuzha, Palakkad.
14. Radhakrishnan, Arupuzha, Palakkad.
15. Manikumaran, Eranakulam.
16. Kannan, Thirunellaya, Palakkad.
17. K. R. Mani, Thirunellaya, Palakkad.
18. Sureshkumar, Alathur, Palakkad.
19. Narayanan, Ottappalam, Palakkad.
20. Gopakumar, Kuthanur, Palakkad.
21. Raveendran, Thirunellaya, Palakkad.
22. Ponnamma, Arupuzha, Palakkad.
23. Suma Sreekumar, Neyattinkara, Palakkad.
24. Mohanan, Parali, Palakkad
25. Raman, P., Pulinelly, Palakkad

District Collector, Palakkad Shri. Mohan Kumar IAS giving out the wheels

* Today the cost of pugmill is Rs.37,500/- and that of motorized wheel is Rs.35,000/-.
We offer a guarantee period of 2 years.

Some of the beneficiaries who received the pugmill/potter's wheels

Ramankutty, Valliamma & Sarada, Thenur

Chithrangathan, Pulinelly

Swaminathan, Pulinelly

Kannan & Narayanan, Arupuzha

Babu, Kazhanichunkam

Velayudhan, Arupuzha

Product Diversification
Value addition of Terracotta by Decoupage, Glazing, Mural work & Ornament making

A. Decoupage

Decoupage is a French technique of decorating terracotta products with printed pictures, photographs etc. The process involves the following steps:

- Polishing the surface of the pot with sand paper.
- Giving a coating of cement primer so that the pot will have a white background. This step is necessitated because the reflection of colours will be better from a white background compared to a brown surface.
- Pasting the required photograph on the white surface with any adhesive say fevicol.
- Manipulate the edges of the photograph with wall putty.
- Paint the remaining portion according to the taste and talent of the artist.
- Give the final glazing by giving a coating of sleek.

Polishing the surface of the pot

Giving a coating of cement primer on the pot

Fixing the photograph on the pot

Painting by the artist

The advantage of this technique is that it enables us to make custom made products with photographs of near and dear ones of the customer which gives a personal touch an ideal item for presentation and mementoes. Because of this and its good aesthetic appeal there is a huge market potential for these products. (Brochures, handouts and CD of the process have been prepared).

B). Glazing of terracotta

Glaze is nothing but a glass. There are two types of glazes, raw glaze and fritted glaze. Raw glaze is a finely ground mixture of minerals like china clay, quartz, zirconia etc. While fritted glaze is prepared after fritting the mineral ingredients and pulverising it into a fine powder.

Fritting means melting and fusing the ingredients by heating the raw material mix to around 1200^0 C. Whether raw or fritted, the glaze powder is mixed with one third its weight of water and ground nicely so that the particle size comes down to less than 0.01 mm and the slurry density is around 1.2 gm/cc. Now the glaze is ready for application.

A three-week training was imparted to the selected trainees (30 persons) from Palakkad, during september-2015 in the preparation of low temperature glazes, their application on terracotta surfaces and the firing schedules and techniques. The resource persons were from CGCRI (CSIR) Khurja Centre, UP.

Demonstration of low temperature glazing on terracotta surface

Products developed using leadless glaze

Glazed wind chime

Glazed terracotta pot

C) Relief Mural Art

Relief Mural Art in clay is of exquisite beauty. This was another diversification activity. During the training the art of fixing relief on wall was demonstrated. Potters with a little artistic bend of mind can learn it and there will be many takers for this type of art.

IRTC has promoted Terracotta Mural art work among the potters and artists. The inherent beauty of the terracotta mural work has attracted many people and as a result IRTC bagged a prestigious work order on the theme "Buddha under the Bodhi tree" (in terracotta). The work was sponsored by Southern Railway Divisional Office, Palakkad. The Bodhi tree is of 15 feet height, 20 feet width and the Buddha statue is 2.25 feet high in sitting posture. The Divisional office has named it as "serenity square". It is attracting the attention of many visitors.

Sri. Anand Prakash, Railway Divisional Manager, Palakkad inaugurating the ceremony

Serenity square – Railway Divisional Office, Palakkad

D) Terracotta Ornament Making

Traditional clay ornaments or terracotta Jewellery has made its place today in the fashion industry. Humble red clay used to mould earthen pots and pans has won tremendous popularity these days and has become a trendy ornament for women of all age groups. These ornaments are environment friendly and easily affordable.

Shri. Ullaskar De from Regional Design and Technical Development Wing, Bangalore and Shri. Sivalingaiah, instructors for Jewellery making supervised the work.

It is very heartening that some of the trainees have taken up the activity quite seriously and IRTC is providing facility for the sale of their products through its emporium "Gramakala".

The training program was well received by the participants and was well covered by the media. A CD also has been prepared.

Dissemination of Activities

Dissemination activities included 1) Trainings 2) Exhibitions 3) Setting up of Emporium 4) Cluster development programs and 5) Arranging National workshops.

1) Trainings

Training in the operation of Motorized potter's wheel and Decoupage

Training was imparted to more them 250 persons in the operation of motorised potters wheel and decoupage. The table below indicates the Panchayaths where training in Wheel operation and Decoupage was imparted.

1	"Elamkulam Grama Panchayath, Malappuram"	15-24 March, 2008
2	"Kunnummal, Velam Panchayath, Kozhikkode"	8-17 March 2010
3	Kunnummal Kakkad/Moderi Panchayath. Kozhikkode	11-20 March, 2008
4	Thenkurissi Grama Panchayath, Palakkad	17-26 July, 2008
5	"Ottapalam Municipality, Palakkad"	13-23 March, 2008
6	Pazhayannur Block Panchayath, Palakkad	15th Oct. - 15 Nov., 2006 (30 days)
7	"Peravoor Block Panchayath, Kannur"	4-14 September, 2006
8	Vengara Block Panchayath, Malappuram	6-16 October, 2010
9	Anthikkad Block Panchayath, Trichur	9-18 March, 2009
10	Mananthavadi Block Panchayath, Wayanad	10-12 December, 2015

Training at Anthikkad Block Panchayath

Training at Kunnummal Grama Panchayath

The trainings were sponsored by the respective panchayaths. IRTC arranged resource persons, motorised potter's wheels, pugged clay and all necessary items required for painting of pottery. The training was for 20 persons for 10 days in all panchayaths except Pazhayannur where it was for 30 days. Since the training camp was in the potter colony or in a nearby area, apart from the registered trainees other women and children also participated in the program.

One training was arraged exclusively for women. Infact, wheel operation was earlier considered a man's job and this training proved that women also can work on electric wheel equally well. The trainer was Smt. Sudha from KVIC unit, Thozhukkal, Thiruvananthapuram.

Smt.Sudha, master trainer from Thozhukkal,Thiruvananthapuram giving instruction to a trainee

Exhibition at Mahalaxmi Saras, Mumbai

Exhibition at Surajkund, Haryana

2) Exhibitions Participated in and outside Kerala

As a part of publicising our products we had participated in many exhibitions conducted in and outside Kerala. Since the year 2000 we had been participating in the grand exhibition arranged by Kerala State council for Science, Technology and Environment (KSCSTE) Govt. of Kerala. The standard of our stall had been always rated high. We had been participating in the exhibitions organised by Swadeshi Science Movement as well. Apart from these, every year we used to participate in more than half-a-dozen local and regional exhibitions i.e. inside Kerala.

Exhibitions participated outside the state

Sl. No.	Sponsor / Venue	Date	Items Exhibited
1	DST., Govt. of India/J.N. Tata Auditorium, IISC, Bangalore.	21st -25th Nov. 2005	Decorated Pots
2	Indian Science Congress/N.G. Renga Agricultural University, Hyderabad.	3rd -7th Jan,. 2006	Decorated Pots
3	Inter National Trade Fair, Pragati Maidan, New Delhi	14th -23rd Nov. 2008	Decorated Pots
4	Indian Ceramic Society Annual Meet/Silpagram, Agra.	19th 22nd Dec. 2011	Decorated Pots
5	NABARD, Regional Office, Trivandrum / Rabindra Sarovar, Goa	19th Jan. -2nd Feb. 2012	Decorated Pots
6	NABARD, Regional Office, Trivandrum/Hyderabad	19th -21st Mar. 2015	Decorated Pots
7	NABARD, Regional Office, Trivandrum/ Mahalakshmi Saras, Bandra, Mumbai	18th -26th Jan. 2016	Terracotta Ornaments, Microwavable Terracotta Pots, Murals.
8	NABARD, Regional Office, Trivandrum / Surajkund, Faridabad, Haryana.	2nd -8th Feb. 2016	Terracotta Ornaments, Microwavable Terracotta Pots, Murals.

Exhibition held at Pragathi Maidan
New Delhi - Chief Minister VS.Achuthanandan visiting the stall

3) Setting up an emporium for rural artisans

"Gramakala" an emporium (plinth area 1500 sq. feet) was set up with KVIC funding at Puthuppariyaram, Palakkad. This showroom was inaugurated by Shri. T. N. Kantamuthan, President, District Panchayath, Palakkad on 16th Dec. 2011. Shri. K. Mohan Raju, State Director, KVIC, Kerala was also present during he occasion.

Shri.T.N.Kantamuthan, District Panchyath President inaugurating the showroom

Right to left : Shri.K.Mohan Raju, State Director, KVIC, Kerala giving the presidential address. Shri.P.V.Anup, Mandalam president, INC,Mundur, Shri.T.N.Kantamuthan, Jilla Panchayath President, Palakkad, Smt.Geetha Satheesh, president, Mundur Grama Panchayath and Dr.M.Lalithambika Research coordinator, IRTC

A view of the audience. Around 200 potters from Palakkad District have attended the function

4) Cluster Development Program

Two potter cluster development work was undertaken by IRTC.

1. At Puthukode, Palakkad, Kerala.
2. At Peravoor, Kannur, Kerala.

Puthukode Potter Cluster:

The Dist. Panchayath, Palakkad has entrusted the work of setting up one pug mill (1 ton per day) and 3 motorised potter's wheels in Puthukode Grama Panchayath. Accordingly the machinery have been installed and commissioned in May 2015. Since then the potters started using the pugmill for grinding of clay, which reduced the drudgery and increased the production rate. 2 kilns also have been constructed under the supervision of Integrated Rural Technology Centre (IRTC), Mundur, Palakkad. Its official inauguration was on 23rd Sep. 2015. Shri. T. N. Kantamuthan, President, Dist. Panchayath, Palakkad, inaugurated the cluster activities. Today all the equipments are regularly used by the potters.

Shri. Kantamuthan inaugurating the Cluster activities

Shri. Vijayakumar supervising the work of insulating the kiln wall with ceramic fibre blanket for better energy efficiency of the Kiln

Peravoor Potter Cluster:

This cluster development work was jointly undertaken by the Peravoor Block Panchayath and Integrated Rural Technology Centre (IRTC), Mundur, Palakkad. The responsibility of the panchayath was to provide the infrastructural facilities, and the responsibility of IRTC was to procure and install the machinery like motorized potter's wheel (8 nos.) and a pugmill (1 ton/day), construction of a kiln and commissioning of the unit and commencement of operation, production and marketing. The program went smoothly. All the members have been grouped as SHG and registered with DIC as a small scale unit – 'Sree

Sree Chakra clay work unit

Chakra clay work unit' (Swayam Sahaya Sangham Reg. No 500/5-1-2015). This was officially inaugurated on 17th April 2015 by Prof. K. S. Sarala, President, District panchayath, Kannur. The enthusiasm and sincerity of Adv. M. Rajan, president, Block panchayath peravoor and his team really deserve appreciation.

Prof. K.S. Sarala (Dist. Panchayath President, Kannur) inaugurating the unit

5) National Workshops conducted

5.1) Pottery Design and Technical Development Workshop

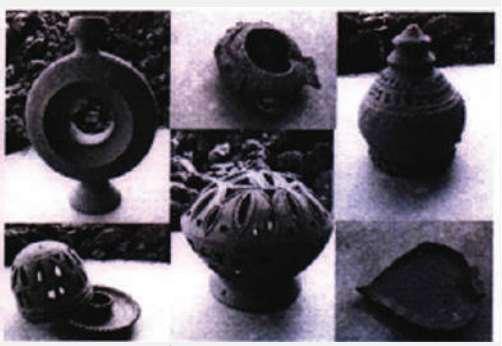
Sponsor: Regional Design and Technical Development Centre, Victoria Road, Bangalore.

A design and technical development workshop in terracotta was conducted for members of various potter communities in Palakkad district. This was aimed at giving training in developing new products in terracotta which are market oriented and adaptable to a more urban and modern life style. Products ranging from large garden sculptures to small diyas were explored depending on the individual skill level of the potters.

The unique feature of the workshop was that an NID Designer and trained staff members from RDTDC, Bangalore were the resource persons. 30 potters got intensive (stipendiary) training for 15 days.

The sum of Rs. 1.5 lakhs spent for this training was totally met by the Regional Design and Technical Development Wing, Office of the Development Commissioner (Handicrafts), Ministry of Textiles, Govt. of India.

District Panchayath President Mrs. Subaida Ishaq delivering the inaugural address



Some of the training products made by the trainees

5.2) National Workshop on Modern Techniques in Traditional Pottery (26th to 30th November – 2012)

IRTC conducted a demonstration workshop in the area of new techniques in terracotta pottery. The items demonstrated were smoke firing, slip casting, jigger jolly, ornament making, glazing of terracotta, mural work and decoupage. It was a 5-day program and the program was much appreciated. The resource persons were from Karnataka, Uttar Pradesh, West Bengal, Tamilnadu and Kerala.

As a technology dissemination program it was a great success.
52 participants were there of which 30 were potters.

Left to right : Dr.M.Lalithambika, Principal Investigator, KVIC-RISC program, Shri.B.Sasikumaran Nair, Manager, Gandhi Smarak Nidhi Unit, Neyyattinkara, Dr.V.N.Rajasekharan Pillai, Executive Vice President, KSCSTE, Trivandrum, Smt.K.P.Lalithamany, State Director, KVIC., Prof.P.K.Ravindran, Director, IRTC and Dr.P.Bhagavatheeswaran, Director, Centre for Social Development, TamilNadu.

CHAPTER III

Impact Analysis (yr. 2000 - 2015)

We did a case study of the socio-economic status of a potter colony at Kazhanichungam, Palakkad where our intervention was there. The indictors were housing, sanitation, education, vehicle ownership, etc.

IRTC, Palakkad was the first organization to intervene in the mechanization of the potter colonies in Kerala. Of the 35 families at Kazhanichungam 20 families have purchased potters wheel and pugmill from IRTC. Keeping the IRTC machines as model some workshops are fabricating potter's wheel and pugmill. Since they can sell the items at a slightly lesser cost some potters are purchasing the machines from the local fabricators.

A comparison of the social and economic status of the potters of this colony in 2000 and 2015 is indicated below

A. Housing

2000	2015
Thatched house - 82%	Thatched house - Nil
Terraced house - 7%	Terraced house - 77%
Tiled house - 11%	Tiled house - 23%

(No one in the colony has thatched house today. All households are either terraced or tiled.)

B. Sanitation

	2000	2015
Toilet facilities	16.00%	91.00%

C. Education

Age Group	2000	2015
5-17	All children were school drop outs	Seriously studying in various classes
18-35	Only 24% completed 10th class	64% completed 10th class
36-60	60% illiterates	38% only are illiterates

D. Vehicle ownership

	2000	2015
Useof vehicles	5% households had cycles	25% household have two wheelers

E. Use of electronic gadgets

	2000	2015
TV	None had TV	All households have TV
Fridge	None had	50% households have fridge
Washing machine	None had	14% households have washing machine
Mobile phone	None had	95% households have mobile phones

F. Income level

	2000	2015
Monthly income	Rs. 2340/-	Rs. 15000/-

G. Occupation

	2000	2015
Pottery work	100% in pottery	Pottery 93% Other salaries jobs 6% (private & Govt. service 1%)

It is certainly the achievement of the DST project.

The introduction of drudgery removing equipments like potter's wheel & pugmill has helped them to increase the productivity. The production increased 2 to 3 times and accordingly their income level has changed from Rs 2000/- a month to Rs 8000/-. Although this is the case of a typical cluster a more or less same trend can be attributed to other clusters as well.

Although, the drudgery relieving equipments like potter's wheel & pugmill was introduced by IRTC later many entreprenuers have taken up the fabrication independently. Since there is competition among them, the potters can get these equipments at a more competitive cost now.

The marketing scenario also has changed. Now the products from the colonies are sold out through vendors who take it to different places by lorry service. They buy the pots at a lower rate, but they pay the money promptly to the potters.

Need for Future Work and Role of LSGIs

Shortage of red clay raw material is a serious problem faced by pottery artisans today. Since this raw material is used for making building bricks and tiles the clay bearing areas were identified and occupied by those who were managing brick and tile industries. The raw material requirement of pottery artisans was sidelined and their need was not taken seriously.They had to compete with the brick and tile industry for raw material . They had been facing many hassles and harassments. In order to get a few tons of clay they had to get permission from different centres- the owner, the panchayath, the geologist and so on. Because of the hassle many artisans have left their trade and taken up other unskilled works.

Unless the Govt. decides that this traditional industry should survive and the traditional artisans are to be protected, this trade will slowly vanish.

How can we overcome this difficulty?

Role of LSGIs : The panchayath can earmark the clay bearing areas under their jurisdiction and make it available to the potters of that area. The expenses for mining and transportation should be borne by the panchayath and the potter can be charged for the clay. Panchayath may also install a pug mill and the pugged clay can be sold in sealed packets of 50 or 100 kg. each. A potter should be able to buy it like any other commodity from the market. Door delivery of pugged clay also can be thought of by the panchayath.

Mining of clay from paddy fields

Many paddy fields have good deposits of earthenware clays. From less productive paddy fields the top soil can be kept aside and clay can be dug out. After mining, the land reclamation can be done by filling the pit and spreading the top soil over the refill so that the paddy field becomes cultivable.

Still another method which can be thought of is after removal of clay from paddy field the low lying area can be converted to a fish pond, rearing edible fish which is a profitble business and helps the food security program.

What ever be the strategy a helping hand from the Govt. side is warranted to protect this craft and livelihood for many..

IRTC – a Nodal Agency of Handicrafts Marketing and Service Extension Centre (HMSEC), Trichur (Ministry of Textiles, Govt. of India)

Since 2006 IRTC works as a nodal agency of HMSEC helping the potter community. Nearly 450 potters got their artisan identity card through IRTC in 2006. During the current year new application had to be submitted for artisan identity card renewal. Potter's had to join Aam Admi Bima Yojana for getting educational scholarship for children and other benefits to the artisans like accident and death claim.

Children of pottery artisans studying in 9th and 10th class, +2 and ITI were eligible for educational scholarship. Eighty five thousand to 1 lakh rupees used to be distributed among the children every year since 2006 till 2012. Under the Ambedkar Hasth Vikas Yojana Scheme 6 families received death claim benefits (Rs. 30,000/- for the nominee) and one accident claim of (Rs. 70,000/-).

Shri. K.V.Sabu, Registrar, IRTC, handing over the scholarship to a student

Scholarship distribution at Thenur by Shri.Rasheed, Panchayath Member

Scholarship distribution at Pulinelly by Smt.Kunjumol, President, Kottayi Gram Panchayath

CHAPTER IV

Awards Received & Papers Presented

The pottery unit of IRTC received Rural Innovator Special Jury Award during 2015 and 2016 Shri. M.N.P. Namboothiri received the award for the Development of "Mini Potters Wheel/Hobby Wheel" in 2015.

Dr. M. Lalithambika received the award for the Development of "Microwavable Terracotta for Cooking Applications" in 2016.

Dr. M. Lalithambika received Smt. Vimala Devi Memorial Award instituted by the Indian Ceramic Society, West U.P. Chapter in 2014 for her contribution in the area of Traditional Pottery.

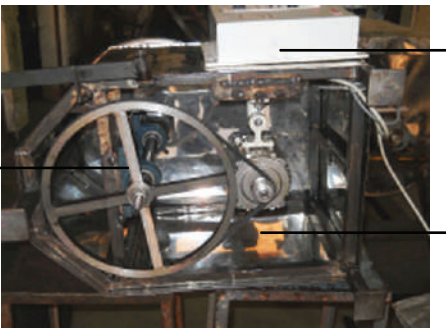
Details are given below, on the Rural Innovator Awards.

Rural Innovator Award - 1

Mini Potter's Wheel/Hobby wheel

MNP.Namboothiri,
IRTC, Mundur
Palakkad-678592

* This machine is used for shaping clay with precision.
* The machine works using the principle of Variable Frequency Drive (VDF)
* The speed of the wheel can be varied at will using leg.
* Clay upto 5 Kg. can be loaded for shaping.
* This machine is women and children friendly.



Front view of the mini potter's wheel

Rural Innovator Award - 2

Rural Innovator's Meet of KSCSTE (RIM - 2016)

Microwavable Terracotta for Cooking Application

Lalithambika.M
IRTC, Mundur
Palakkad – 678592
Mob:9446509414

Cooking with a microwave oven is very common these days. In the present work ecofriendly terracotta pots have been tested for microwave cooking.

Mechanism of microwave cooking:

Microwave ovens work by having an internal magnetron emit electro magnetic waves around the frequency of 2.45 GHz (vibrating at around 2.45 billion times/sec). These waves are absorbed by water molecules, fat molecules, sugar molecules etc. which then heat up by a process known as dielectric heating. Water (H2O) is a polar molecule ie. they have positive charge and a negative charge on opposite ends. Thus they will rotate themselves rapidly (flipping) when trying to align themselves with the alternating electric field from the microwave. These vigorous movements of water molecules raise the temperature of water which enables cooking of food materials. At present it is almost taken for granted that we need to use plastic vessels only for microwave cooking.

The clay pots for microwave cooking has the following advantages.

1. Food prepared in the earthenware pot is absolutely healthy compared to plastic and other materials.
2. The vessels are less expensive.
3. They are 100% ecofriendly.

Microwavable Terracotta

Papers Presented

Proceedings of 27th Kerala Science congress Alappuzha, 27-29 January 2015

MODERNIZATION OF TRADITIONAL POTTERY

M. Lalithambika
Integrated Rural Technology Centre, Mundur, Palakkad, kerala.

ABSTRACT

Integrated Rural Technology Centre (IRTC) conducted the Techno - Socio- Economic Survey on the Living and working Conditions of the Potter Communities of kerala during 2000-2004. It was found that this community was educationally, economically and socially backward. Their production techniques were primitive, the product choice was limited and marketing methods very inefficient. IRTC made an intervention by modernising and mechanising their outdated skills and introduced diversified products. IRTC developed a mini pugmill which could be used by individual potters for reducing drudgery and improving the quality of the products. An energy efficient potter's wheel was introduced for improving productivity and quality. Value addition was effected by introducing decorated pots, ceramic ornaments and microwavable cooking pots. Marketing also was modernised by participation in exhibitions, sales through organised agencies and setting up an emporium in Palakkad.

LOW TEMPERATURE GLAZING ON TERRACOTTA BODIES

Lalithambika.M*. Mahesh. E*, Sujith.S.Nair*, Yad Ram**
*Integrated Rural Technology Centre, Mundur, Palakkad, Kerala
**Central Glass and Ceramic Research Institute (CSIR), Khurja Centre, U.P

The technique of glazing is used for improving the surface finish and removing water permeability from ceramic bodies. Glazing of porcelain is widely practised all over the world. But low temperature glazing on terracotta bodies is rather a new area. Since red clay is a low maturing material (~800-900oC) compared to porcelain body (>1250oC), the glaze used on terracotta also should attain glass formation at a low temperature (~900oC). Earlier low temperature glazes were prepared using lead oxide as one of the ingredients. Because of the inherent drawback of toxicity of lead glaze attempts are being made recently for preparing leadless glazes which give glossiness and elegance to the ceramic surfaces.

In the present work, terracotta clays were collected from two locations in Palakkad district a) Ayaloor, Nenmara (10.5938oN, 76.5996oE), and b) Aanikod, Kuzhalmannam (10.7158oN, 76.589oE) for preparing terracotta bodies and application of low temperature galzes. Samples collected from the above areas have been subjected to coning and quartering followed by blanching and the slurry was sieved through 350# sieve (BIS). The fine fraction (-45 micron) was collected, dried and subjected to physical, chemical and mineralogical characterization. X-Ray analysis indicated that the major mineral components in these samples are kaolinite and quartz. The physical properties like grit content, water of plasticity, dry and fired shrinkage, modulus of rupture etc. have been determined. Loss on ignition, percentage of silica and alumina also have been estimated.

Physical properties of the clay samples							
Sl. No.	Sample	Grit content (%)	Water of plasticity (%)	DLS (%)	FLS (%)	MOR (Kg/cm²)	
						Dried	Fired
1	Ayaloor clay, Palakkad	54.56	23.59	9.16	1.25	16.24	68.51
2.	Aanikode clay, Palakkad	44.41	25.58	4.76	1.02	12.73	42.05

- DLS – Dry Linear Shrinkage
- FLS – Fired Linear Shrinkage
- MOR – Modulus of Rupture

The evaluation of the physical, chemical and mineralogical parameters indicated that the clay is suitable for making unglazed and glazed terracotta products. These products were glazed using a lead free fritted glaze. The composition of the frit was borax-33 %, potassium feldspar – 14 %, soda feldspar-14 %, quartz-10 %, soda ash-10 %, lithium carbonate – 6 %, barium carbonate – 3%, zinc oxide – 3% and calcite-7%. This mixture was fused at 1200oC to make the frit. The glaze was prepared using 70 % frit powder and 30 % washed red clay. This was ground with water in a mortar and pestle. The slurry density was adjusted to 1.3 gm/cc and this was applied on the terracotta ware, dried at 60oC for 2-3 hours and fired in a programmable furnace at a temperature of 925oC with a soaking period of 30 minutes. Different colours have been tried by mixing different commercial stains with the glaze. Many attractive glazed products have been prepared with utilitarian and ornamental applications.

Acknowledgements

We, at IRTC, acknowledge the help rendered by different agencies and persons. IRTC is grateful to the Department of Science and Technology, Govt. of India for its unstinted support all these years. We thank Dr. Mrs. Vinita Sharma, Mrs. Sobhana Bhaskaran, Dr. Sunil Agarwal and Shri. Anish N.P for the constant help from this department. Thanks are also due to the Khadi and Village Industries Commission, Govt. of India and the Centre for Development Studies, Govt. of Kerala for their financial support. We place on record the constant support given by the Directors and Registrars of this organization particularly Dr. R.V.G. Menon who was also the Research Advisory committee chairman during this period who has contributed much towards the developmental work of the machinery. Shri. M.N.P. Namboothiri and Shri. C.K. Sasikumar who were in charge of the workshop played a key role in the fabrication and time to time modification of the pottery machinery for better performance.

Special thanks to Prof. P. K. Ravindran whose dynamic decisions have helped the programs positively and also to the present Director Dr. N.K. Sasidharan Pillai and the Registrar Shri. P.K. Narayanan whose positive approach and enthusiasm helped in the speedy completion of this work.

We thank Shri. P. Balaram for the sincere effort he has taken during the first survey program which resulted in an authentic report on the potter communities of Kerala and also Shri. Gopakumar. P., who was the master trainer in all the training programs.

Thanks are also to all my colleagues in the ceramics laboratory, workshop and reprographic section, viz. Mahesh. E, Sujith S. Nair, Haridas. A., Jayesh. K.R., Lakshmi.T.P., Jasna, E., Prajeesh. A., Subesh Babu. K.K., Vinoy, P.T., and Shinton, P.C. for their constant support, hard work and co-operation.

30-09-2016

Mundur

Principal
Investigator
Dr. M. Lalithambika

Annexures & Paper Reports

List of officials Interviewed

1. K.M. Das, General secretary, PMTS, Trivandrum.
2. M. Kunchu Master, Founder Member, Oda mahasabha, Trichur.
3. K. Rajashekharan, Founder Member, Kulala Dederation, Tripallur, Palakkad.
4. M.K. Nair, President, Federation of Traditional Potters Welfare Society, Kozhikode.
5. K. Kuttamani, General Secretary, Kerala State Clay Workers Union (Kumbaran community) Trichur.
6. K.B. Jinan, activist, Aruvakkod, Nilambur, Malappuram.
7. Chamikutty, General Secretary, Federation of Traditional Potters Welfare Society.
8. K. Chami, District Secretary, Kumara Association.
9. U. Subhadra Social Worker Trippalur, Palakkad.
10. P.K. Kunchu, Office Bearer, Oda Mahasabha, Kerala.
11. K.K. Narayanan, Office Bearer, Kulala Federation, Periya, Kasaragod.
12. K. Kuttan, Office Bearer, Kulala Federation, Periya, Kasaragod.
13. V.P. Chinnamani, Officer Bearer, Kumbara Association, Palakkad.
14. V.K. Jayan Terra Craft, Ernakulam.
15. N. Narayanan Nair, Pottery expert, TVM.

List of Potters' Co-op Societies visited for data collection

1. Potters' Industrial Co-op Society, Thozhukkal, TVM.
2. Khadi & Village Industries Co-op Society, Kuzhumad, Ernakulam.
3. Pottery Co-op Society, Pattath, TVM.
4. Pottery Co-op Society, Velinallur, Kollam.
5. Potters' Co-op Society, Chelannur, Kozhikkode.
6. Potters' Industrial Co-op Society, Shoranur, Palakkad.
7. Umattinkara Clay Cottage Industries Co-op Society, Kallissery, Alappuzha.
8. Mithrakari Pottery Industrial Co-op Society, Mithrakari, Alappuzha.
9. Pottery Industries Co-op Society, Kattachira, Kottayam.
10. Potters' Co-op Society, Kannapuram, Kannur.
11. Potters' Co-op Society, Oyur, Kollam.
12. Potters' Co-op Society, Kanjani, Trissur.
13. Potters' Co-op Society, Anthamon, Pathanamthitta.
14. Potters' Co-op Society, Thalavadi, Alappuzha.
15. Potters' Co-op Society, Karumathur, Ernakulam.
16. Potters' Co-op Society, Andimadam, Palakkad.
17. Potters' Co-op Society, Thenur, Palakkad.
18. Potters' Co-op Society, Kakkodi, Kozhikode.
19. Potters' Co-op Society, Periya, Kasaragod.
20. Potters' Co-op Society, Thaliparamba, Kannur.

Government and private institutions engaged in pottery work

1. Terra Craft, Pappanamkode, Trivandrum.
2. Terra Craft, Thripunithura, Ernakulam.
3. Raja Tile Works, Thrissur.
4. Kap India, Thrissur.
5. Gandhi Smaraka Nidhi, Thozhukkal, Trivandrum.
6. Babu Potteries, Poikattussery, Ernakulam.
7. Mahalakshmi Potters works, Karumallur, Ernakulam.
8. Mani Pottery Works, Madakkathara, Thrissur.
9. Aiswarya DWCRA, Unit Karumallur, Ernakulam.
10. Ammu Pottery Works, Karumallur, Ernakulam.
11. Kumbham, Aruvakode, Malappuram.

Annexure-4

BROCHURE - 1

Do it yourself : Decoupage

Step 1:
Get the red clay pots from a potter colony. Designs can be worked out in consultation with the pottery artisans

Step II :
Polish it nicely with sand paper so as to make the pot surface smooth.

Step III : Make the surface whiate by the application of cement primer.

Step IV : Fix the photographs of your choice with fevicol. (It will be nice if you peal off the bottom layer of the photo so that the photographic sheet become very thin)

Step V : Apply a little cement putty at the edges of the photographs, allow it to dry and mirror polish this area. Now the pot is ready for painting

Since personalized items can be made with this technique, decoupage products are excellent gift items.

Annexure-5

BROCHURE - 2

Make it yourself : Terracotta Jewelry

How to make the starting raw material ?

Plastic clay usually available on river side and paddy fields is bunged in water and sieved through 350 mesh so that all particles are less than 40 microns (<0.004 cm). Clay slurry is allowed to settle. Water is drained and the thick slurry is dried to get the clay mass. This has to be aged for nearly 10 days to make it more workable. It is dried such a way so that when you roll the clay inside your hand it does not stick.


Making a coil

How to make round beads : First you have to make a coil of the required diameter. Then cut it into several equal parts and make balls of perfect round shape and keep them aside for nearly 5 minutes so that they become leather hard. Now designing can be done with the help of a


Making a ball in your palm

The beads/balls are pierced with a thin round rod, like a ball point refill tube so that you can get a perfect hole through the bead.


Making hole through a bread


Making designs

How to make lockets ?

Take a piece of wet plastic clay.

With the help of simple tools one can make pendants by handwork.


Making designs

Now these items are allowed to dry for 2 days and fired in a small country

chulah. If it is fired in presence of oxygen the items will burn brick red. And if you fire the red burned items in presence of smoke it will turn black.

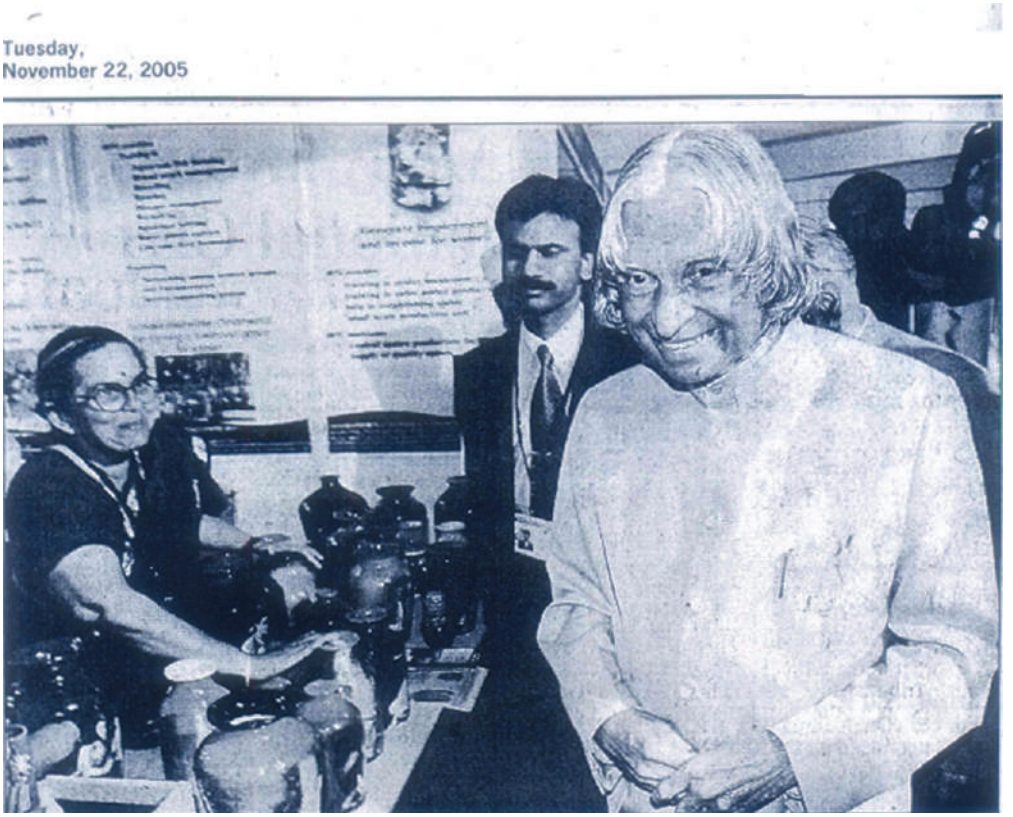

Small Chulah

Stringing the pendants and beads and fixing hooks to the ear ring are the last steps.

Your ornaments are ready for wear.


Clay lockets

PAPER REPORTS



President A.P.J. Abdul Kalam inaugurated the Third World Organisation for Women in Science Exhibition in Bangalore on Monday the 22nd Nov., 2005 - Express photo; Indian Express Daily

16th November 2008; Times of India

Paint pots at Kerala stall

Visitors Throng Pavilion Teaching French Decorative Art

Sapna Verma | TNN

New Delhi: While each pavilion at the India International Trade Fair 2008 is doing its best to catch the visitors' attention, one particular stall at the Kerala pavilion seems to have made the most of the opportunity. Not only does it have some breathtaking exhibits, but it's also teaching visitors the art of painting earthen pots by hand. Embracing this year's IITF theme — Women Empowerment and Infrastructure — the Kerala stall is, in its unique way, stirring up people's creative sensibilities.

"The fair is not just about attractive products, delicacies and fun, it's also a platform for inter-state cultural learning. Several artists from Kerala are teaching visitors and representatives of NGOs the art of painting to add value to unattractive pots," said Lalitambika, a scientist at Council of Security and Industries, also the mentor of program in Kerala.

She added, "Personalized messages are imprinted on real mud artifacts through the exotic French decorative art of 'decoupage'. This is the skill which the artistes from Kerala are teaching people here."

And, it's not just for fun that they are spreading the art. Instead, the artistes believe there is a deeper motive behind it. An artist, Parvathy Chandran, explains, "I come from a very poor family. I could not even provide my family with a two-square meal. But, my life changed after an organization taught me the skill a year ago. Thereafter, I encashed on the opportunity and it has become the means of my livelihood ever since."

Explaining the art, Chandran said, "Decoupage is the art of decorating an object like a pot by sticking coloured paper cut-outs on it in a combination. It's done with special paint effects, gold leaf work etc. I want to spread this art so that several other women like me can empower themselves financially through it."

Thirty-two-year-old Mahesh Kandpaal, a photographer and a teacher at an MCD school, visited the fair on Saturday. He took back the skill which, he says, he will share with his students. Mahesh said, "I wanted to click some photographs and see the exhibition. These artists caught my attention. After watching them for sometime, I asked them to teach me."

He also said, "The MCD school where I teach has most of its children coming from slum clusters. If I share this art with them, some of them can take it up seriously and support their families. I am even planning to bring them to the fair so that they can learn it."

toireporter@timesgroup.com

Piyal Bhattacharjee

LEARNING WITH FUN: People design pots at Kerala stall (top); a girl at the trade fair on Saturday

11th November 2012; Mathrubhoomi

കളിമൺകലാപ്രവർത്തക പരിശീലനം 26 മുതൽ

പാലക്കാട്: മൺമറഞ്ഞുപോകുന്ന കളിമൺകലയെ സംരക്ഷിക്കുന്നതിനും ഇതുമായി ബന്ധപ്പെട്ട് നൂതനമേഖലകളിൽ തൊഴിൽപരിശീലനം നൽകുന്നതിനുമായി പാലക്കാട് മുണ്ടൂർ ഐ.ആർ.ടി.സിയിൽ അഞ്ചുദിവസത്തെ ക്യാമ്പ് നടക്കുന്നു.

കളിമൺ ആഭരണങ്ങൾ, മ്യൂറൽചിത്രങ്ങൾ എന്നിവയുടെ നിർമാണം, ജിഗ്ഗർ ജോളി പരിശീലനം, ഡെക്കോപാഷ് തുടങ്ങിയവയിൽ പരിശീലനം നൽകുകയാണ് ലക്ഷ്യം.

കേരളം, തമിഴ്നാട്, കർണാടക, ബംഗാൾ തുടങ്ങിയ സംസ്ഥാനങ്ങളിൽനിന്നുള്ള വിദഗ്ധരാണ് പരിശീലനം നൽകുക. കുംഭാരന്മാർക്ക് മുൻഗണനയുണ്ട്.

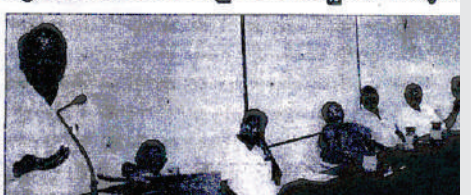
കളിമൺരൂപകൽപ്പനയിലും, ആഭരണനിർമാണത്തിലും അഭിരുചിയുള്ളവർക്ക് പങ്കെടുക്കാം. ഫോൺ: 0491-2832324, 9446509414.

പെൺകരുത്തിന്റെ കൂട്ടായ്മയിൽ അലങ്കാരപ്പാത്രനിർമാണം

പള്ളിയത്തെ തണൽ സ്വയംസഹായസംഘാംഗങ്ങൾ അലങ്കാരപ്പാത്രനിർമാണപരിശീലനം കാണുന്നു

27th November 2012; Deshabhimani

ുണ്ടൂർ ഐ.ആർ.ടി.സി.യിൽ കളിമൺ ശില്പശാലാക്യാ



മുണ്ടൂർ ഐ.ആർ.ടി.സിയിൽ കളിമൺശില്പശാല കുന്ന് ഡോ. വി.എൻ. രാജശേഖരപിള്ള ഉദ്ഘാടനം ചെയ്യുന്നു

മനസ്സിലൊരു നാട്ടിൻപുറമുണ്ടോ?

ഇതു കാണണം

a frisson of innovation

porter

ANTHAPURAM: Yesu- the areca nut in the a cutter he has de- nd in a second, the ne off revealing the ling areca nut never is easier and effort- many in the audi- d their hand at it. utter is among the ovel products dis- t an exhibition of aimed at sustaina- pment organised by a Sastra Sahitya Par- t University College in connection with ay Kerala Develop- t. Mr. Yesudas has three types of cut- g different blades nal, priced between d Rs. 1,500.

Products by the Integrated Rural Technology Centre (IRTC) on display at an exhibition organised by Kerala Sastra Sahitya Parishad in Thiruvananthapuram on Monday. – PHOTO: S. MAHINSHA

ign is based on the l cutter, but is capa- ing large quantities. blade cutter comes ty cap and an addi- hine holder. nthosh has come smokeless stove, l earned him the rd for innovation by the Kerala State Council for Science, Technol- ogy and Environment.

Mr. Santhosh said the stove was fuel-efficient and could be easily installed in homes.

"The stove is smokeless as the smoke and heat are trapped inside a locally cast arrangement. While the car- bon stays inside this shaft, the oxygen helps in further burn- ing, thus improving the effi- ciency of the stove," he said.

Homemade food such as jams, pickles and squash; jew- ellery; and decorative bam- boo products are displayed at the exhibition.

The Central Ground Water Department, Costford, WWF and various other organisa- tions are participating in the exhibition, which will clude on May 1. Madhav gil, ecologist, will inaug the Kerala Develop Meet at the college on T day.

Various seminars and cussions on topics, inclu food safety, conservatio nature and waste man ment, will be held at the m

2013 April 31; The Hindu

28th January 2015;
malayala Manorama

ർപാത്ര നിർമാണം
നായാസമാക്കാൻ

ൻപാത്ര നിർമാണം ഉപജീ
ർഗമായി സ്വീകരിച്ചിരി
ന കുംഭാരന്മാരെ സഹായി
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ിലെ ഡോ. എം. ലളിതാം
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യോഗിക്കുന്ന ചക്രത്തിൽ
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പ്പാൻ ഇതുവഴി കഴിയും.

ാസമന്ത്രിയിൽ കുടുതൽ
ങൾ നിർമിക്കുക വഴി
ണികമായും നേട്ടമുണ്ട്

29th January 2015;
Mathrubhoomi

കളിമൺ പാത്രനിർമാണ മേഖലയിൽ
പുത്തൻ ആശയങ്ങളുമായി ഡോ.ലളിതാംബ

ഡോ. എം. ലളിതാംബിക

ആലപ്പുഴ: എഴുപത്തൊന്നിന്റെ
രഷിണം വകവയ്ക്കാതെ ലളിതാംബി
ക യാത്രയിലാണ്. മൺപാത്രങ്ങളു
മായി ജീവിക്കുന്ന കുംഭാരൻമാരു
ടേയും കുശവൻമാരുടേയും ജീവി
തം ഒരു കരയ്ക്കെത്തിക്കാൻ.
കേരള ശാസ്ത്ര കോൺഗ്രസിൽ
കളിമൺ പാത്രങ്ങളെ വാണിജ്യവ
ത്കരിക്കാനുള്ള പുതിയ ആശയ
ങ്ങളുമായാണ് ഡോ.എം.ലളിതാം
ബിക എത്തിയത്.
ഫോട്ടോ ഫ്രെയിം ചെയ്യാവുന്ന
തരത്തിൽ പ്രത്യേകം നിർമ്മിച്ച
മൺപാത്രങ്ങളം, കളിമൺ കഷണങ്ങളം ചുവ
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ചെയ്ത ചെടിച്ചട്ടികളം, അല
സ്തുക്കളം... ഇങ്ങനെ ചട്ടിയ
വും ഉണ്ടാക്കി നടന്നവരെ
ടിച്ചുയർത്തുന്ന ആശയ
യാണ് ഇവർ എത്തിയത്.
ഗ്രേറ്റഡ് റൂറൽ ടെക്നോള
ർവർ ഡയറക്ടറാണ് ഡോ.ല
ബിക. കളിമണ്ണിന്റെ
മാർന്ന ഉത്പന്നങ്ങൾക്ക് വ
ലഭിക്കുമെന്ന് ഇവർ സാക്ഷ
ത്തുന്നു.
കളിമണ്ണ് ഉത്പന്നങ്ങം
ക്കുന്നവർക്കായി വൈദ്യു
ക്രം, അസംസ്കൃത വസ്തുക്കളം എന്നിവ
ക്കുകയാണ് ആദ്യം ചെയ്യേണ്ടതെന്നാണ്
ലളിതാംബികയുടെ അഭിപ്രായം.

കേരള സയൻസ് കോൺഗ്രസ്സിന്റെ ഭാഗമായി ജനുവരി 27 മുതൽ 30 വരെ നടത്തിയിരുന്ന സയൻസ് എക്സിബിഷനിൽ ഐ.ആർ.ടി.സിയുടെ സ്റ്റാളിന് എൻ.ജി.ഒ യുടെ ഇടയിൽ നിന്നും ഒന്നാം സ്ഥാനം നേടാൻ കഴിഞ്ഞു

16th July 2015; The Hindu

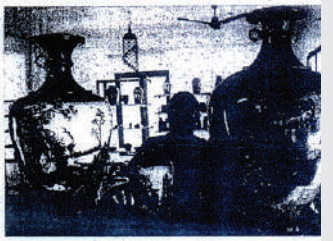
Moulding Kerala pottery in French styl

Turning pots into gift articles using 'decoupage' technique

A. Shaji

LAKKAR: The Integrated Rural Technology Centre (IRTC) under the Kerala Sastra Sahitya Parishad (KSSP) has launched a major value-addition initiative by blending traditional Kerala pottery with French aesthetics, to ensure livelihood security for potters.

Training classes for potters are being organised on the IRTC campus at Mundur, near here, where exotic French decoupage art techniques are transforming ordinary terracotta pots into burnished gift articles. The fine-crafted products, after firing the potters find new markets and earn better returns. The products will be available at IRTC's new selling wing Samatha from Tuesday.



WORKS OF ART: *Terracotta products made using France's 'decoupage' techn on display at a retail outlet of the Kerala Sastra Sahitya Parishad's Integrated Rural Technology Centre at Mundur in Palakkad.* – PHOTO: K.K. MUS

Open to all

IRTC project coordinator C. Lalithambika told The Hindu that the training was open to all those interested in pottery. But preference would be given to those from the Kumbhara community, as they were traditionally engaged in pottery.

The products available at Samatha were made by potters in Palakkad while those produced at IRTC could manufacture and retail their products even without using the network of the KSSP.

"We are providing training to potters on how to apply France's 'decoupage' technique to decorate finished products, mainly those in terracotta category. Customer-specific decorations can be made on clay products using the techniques. We normally inscribe Ravi Varma paintings, Da Vinci portraits, and Michael Angelo masterpieces on them," said Lalithambika who has been working with potters for over three decades.

"We have already trained over 200 potters in Palakkad and they all feel that the value addition is beneficial. It helps them regain lost markets," she said.

The IRTC is also sending the products to retail networks in Delhi, Mumbai, and other major cities.

Free of cost to women

"The IRTC plans to train about 400 potter families in the coming months. While woman potters are trained free of cost, Rs.600 is charged from men," said Lalithambika, a former scientist with the Council of Scientific and Industrial Research (CSIR).

"Leading craft bazaars in Delhi [last] June showed strong interest in our products. Even personal gifts of the buyer can be inscribed over the clay product using French technique. People either buy a finished product off the shelf or supply a photograph with an appropriate message and take back the personalised gift after a while," she said.

23rd November 2015; Kerala Kaumudi

കളിമൺകൽ കലകൾ സെമിനാർ 26ന്

പാലക്കാട്: മുണ്ടൂരിൽ പ്രവർത്തിക്കുന്ന ഇന്റഗ്രേറ്റഡ് റൂറൽ ടെക്നോളജി (ഐ. ആർ. ടി. സി) 26 മുതൽ 30 വരെ ഐ. ആർ. ടി. സി. ക്യാമ്പസിൽ കളിമൺകൽ കലകൾ സംബന്ധിച്ച് ദേശീയ സെമിനാർ സംഘടിപ്പിക്കുമെന്ന് ഡയറക്ടർ പ്രൊഫ. പി. കെ. രവീന്ദ്രൻ വാർത്താസമ്മേളനത്തിൽ അറിയിച്ചു. 26ന് രാവിലെ പത്ത് മണിക്ക് കേരള ശാസ്ത്രസാങ്കേതിക പരിഷത്ത് കൗൺസിൽ അഡ. വി. എൻ. മാധവൻപിള്ള ഉദ്ഘാടനം ചെയ്യും. കെ. വി. ഐ. സി. ഡയറക്ടർ കെ. പി. ലളിതാമണി അദ്ധ്യക്ഷത വഹിക്കും.

മൺപാത്രങ്ങളെ കനപ്പിച്ചെടുക്കുക, ഇരട്ട ആകൃതിയിലും വലുപ്പത്തിലുമുള്ള പാത്രങ്ങൾ ഫ്യൂസർ ഫ് പാരസ് അൾഡിന്റെ സഹായത്തോടെ ഉണ്ടാക്കുക, ജിത്തിയിൽ പിടിപ്പിക്കുന്ന ടെറാക്കോട്ട കൊണ്ടുള്ള ഉല്പന്നങ്ങൾ ഫ്രഞ്ച് ടെറാക്കോട്ട് ആഭരണങ്ങൾ ഉണ്ടാക്കുക, മൺപാത്രത്തിന്റെ പുറത്ത് പല നിറത്തിലുള്ള ഗ്ലാസ്കവറിംഗ് കൊടുക്കുക തുടങ്ങിയ വയാണ് ദേശീയ സെമിനാറിന്റെ ഭാഗമായി നടക്കുക. കൽക്കത്ത, ബാംഗ്ലൂർ, തഞ്ചാവ് എന്നിവിടങ്ങളിൽ നിന്നുള്ള വിദഗ്ദ്ധർ സെമിനാറിൽ പങ്കെടുക്കും. കളിമൺ കലയിൽ പ്രാവീണ്യവും വൈദഗ്ധ്യവുമുള്ളതൊഴിലാളികളെ വാർത്തെടുക്കുകയാണ് സെമിനാറിന്റെ ലക്ഷ്യം.

9th August 2016; The Hindu

Now, microwave your food in terracotta pots

Microwavable clay pots are non-toxic, eco-friendly and cost-effective

R.K. Rosera

THIRUVANANTHAPURAM: Earthenware has been used for cooking across the globe for centuries. While kitchenware in new materials continues to be developed, terracotta pots have made a sort of a comeback. It is not uncommon to find one or more of these in kitchens, whether of the affluent or the not-to-well-off, as people look to deepen their connection with their roots and a way of life that is healthier. But taking their utility value a step further are microwavable clay pots.

Unlike plastics which are routinely used to heat food, microwavable clay pots are non-toxic, eco-friendly and cost-effective, says M. Lalithambika who was Director of the Integrated Rural Technology Centre, Mundur, Palakkad, which is also into commercial production of the microwavable clay pots.

Red clay found in low-lying areas such as riverbanks and paddy fields goes into making earthenware. But unlike the clay used for making bricks and tiles, that used in earthen pots has to be very fine - it should be below 45 mm in diameter (45 microns). Blanching, settling, and sieving help remove impurities such as sand and metal from the clay. Metal particles such as iron and aluminium if present in the body of the pot can cause local heating, and the pot can break.

To make the pots microwavable-safe, it is ensured that the pots have no metal impurities, says Ms. Lalithambika who retired as Deputy Director of the National Institute for Interdisciplinary Science and Technology at Pappanamcode here. The pots are then fired at 800-900 degree Celsius in electric kilns or those which burn wood.

During the cooking process, the electromagnetic waves emitted by the magnetron in a microwave oven are absorbed by polar molecules such as water, fats, and sugars in food which heat up. The molecules try to align themselves with the alternating electric field from the microwave, raising temperatures and enabling cooking of food.

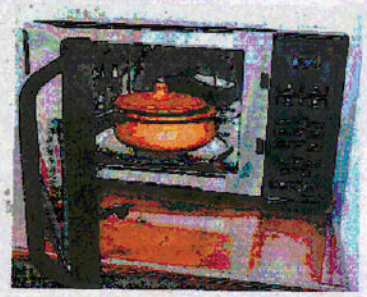
As the cooking is quick, it saves energy.

Heating is uniform, and food nutrients are preserved. Firing the clay pots at high temperatures makes them unlikely to react with food materials even if the cooking tempetature rises. It is also healthier as no oil is required.

Moreover, these clay pots can help reduce the use of plastic containers that are used to cook or heat food, Ms. Lalithambika says. Plastic containers are prone to etching and pitting on regular use. Microwavable terracotta pots are non-toxic and eco-friendly, she says.

The microwavable terracotta pots are made by trained potters and repeatedly tested at the IRTC for their performance before these are sold, she says.

Steps have also been initiated for online sale of these pots, she says.



SAFE FOR COOKING: Terracotta pots can be now used in microwave ovens.

മൺചൂളകളിൽ ഭാഗ്യം വിരിയിക്കാൻ ഇവർക്കു കൂട്ടായി പഞ്ചായത്തും

M.Lalithambika who is the Principal Investigator of the various projects taken up in the area of traditional pottery had Ph.D in Chemistry from Indian Institute of Technology, Kanpur in 1972. She had joined National Chemical Laboratory, Poone (CSIR) as scientist in 1976 and later joined NIIST, Trivandrum on transfer. Her area of expertise is Clay Science & Technology. After retirement in 2003 she started working with IRTC, Mundur, Palakkad for the upliftment of the potter community.

Husband: Dr.R.V.G.Menon,
Children: Ram.V.Gopal, Balram.V.Gopal,

E-mail: lalithambika43@gamil.com, Mob: 9446509414