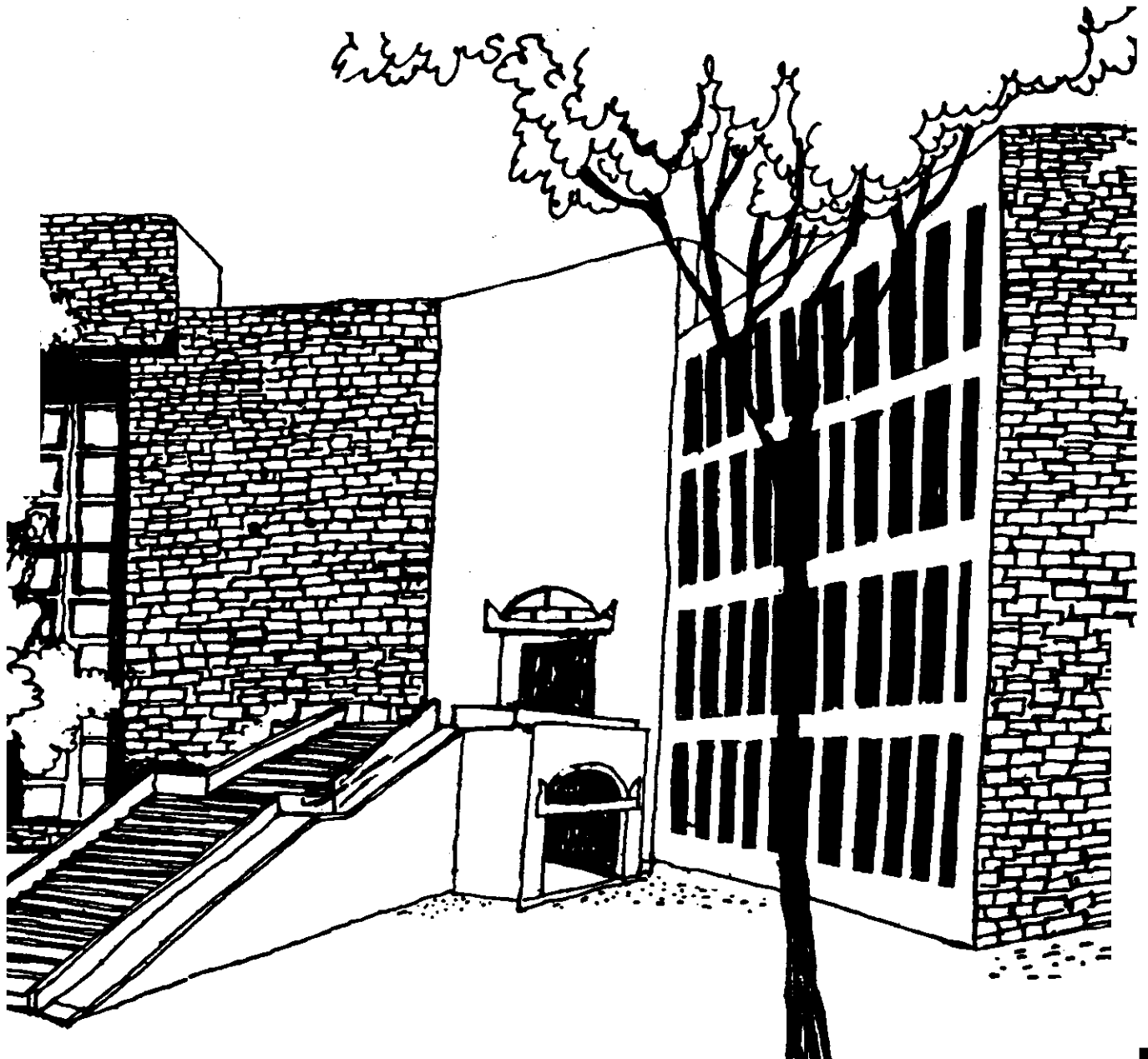




# Working Paper



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TRANSFER OF TECHNOLOGY IN INFORMAL  
SECTOR: A CASE OF POWER GHANIS IN  
A TAMIL NADU VILLAGE

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## ABSTRACT

In the initial phases, improved technologies have always been difficult to popularise among the target adoptors. To overcome this constraint, the authorities charged with the task of popularising them have opted to offer different kinds of incentives to the prospective adoptors. Such incentives are often in the form of grants, institutional loans at highly subsidized rates of interest, tax exemptions and subsidized tariffs. In the case of institutional subsidized loans, the criterion employed to identify the beneficiaries is the creditworthiness of the prospective beneficiary - in other words his resource position. Such a policy bypasses, ruthlessly, the resource poor individuals though they may be willing to take the risk and motivated. Most often the technologies are more productive than traditional ones. Thus, their adoptors enjoy considerable advantage of returns over non-adoptors. If such technologies are passed on to a select and resourceful section among people having a common profession, they are likely to generate income inequalities and wealth disparities in due course. Also, their return advantage character could displace the non-adoptors from their profession. More often, such displaced individuals have to either give up the profession and find employment avenues elsewhere such as in agriculture labouring or seek daily wage jobs with the successful adoptors of improved technology who establish stability, expand their operations and acquire a sizeable proportion of market share of the activity. In other words, a definite structural retrogression takes place in the economic position of the people in the profession. The pivotal factor leading to the above course is the policy regarding the incentives and the criterion chosen to grant and their administering. It is therefore imperative on the part of the technology transfer policy formulation agency to have a critical thinking on all these factors before it finalises the policies and draws up programmes for their execution. The following case which deals with popularisation of improved (power) ghanis in a Tamil Nadu village is an empirical illustration of the above phenomenon.

Transfer of Technology in Informal  
Sector: A Case of Power Ghanis in  
a Tamil Nadu village

The Setting

Kumaraswamy Palayam is a remote village in Periyar District, Tamil Nadu. It is located by 35 kms south of Erode, which is a district headquarter and a fast growing industrial township. The village is connected only by a muddy road and has about 90 households. Kumaraswamy Palayam is essentially a caste-based society. Majority of the households belonged to goudas(farmer) and chettiyars (telis or the oil processing community). The chettiyars numbered 28 households.

In the past, chettiyars employed the conventional bullock driven ghani technology for processing the oilseeds. Most of their households owned a bullock ghani, a pair of draught animals (usually bullocks and cows) and a small piece of land, often unirrigated. The chettiyars' is a homogenous community. Professionally too, they observed a great deal of mutuality and reciprocity among them. They often interexchanged raw materials, ghani-times, ghani-accessories and bullocks to accommodate mutual requirements. And, at times of necessity, a household's output was agency-traded by other members of the community.

The chettiyars procured oil seeds grown in the region (mostly groundnut, sesamum and castorseed) from farmers, processed and sold the oils and cakes locally. Occasionally, they also undertook job processing operations for the village. Generations in succession, they established an enduring clientele with the people of the surrounding villages. The bullock ghanis

were indigenously fabricated by the village carpenters and craftsmen using the local wood material. Some of the chettiyars themselves acquired the skills of manufacturing the rope-harness and other accessories for the bullock drive (viz., curbs, collars, broddles, girthbands, reins etc.). Thus, the chettiyars in Kumaraswamy Palayam had largely been self-supporting entrepreneurs.

#### The decline of bullock ghani

Times, however, have changed for the chettiyars lately, and more so since about a couple of decades. At Erode and in other towns in the region, power driven oil expellers and rotaries have sprung up slowly. Of late, dicorticators and the solvent extraction plants too were annexed to these expeller units which undoubtedly helped to build up a great deal of vertical (process) integration in the industry. The result was a perceptible fall in the processing cost per unit of oilseeds crushed, largely due to the scale - economies. Obviously, a large proportion of the village population gradually preferred and patronised the power operated expellers to process their oilseeds, leaving the chettiyars in distress. The growth of the road infrastructure in the region connecting a large proportion of villages to the townships further facilitated this trend.

This shift in the technology patronage took place despite the general consumer preference to the ghani processed oil. At the chettiyar's front, the relative cost of processing by bullock ghanis went up manifold during these years. This was a result of increase both in the capital costs, and in the variable costs of ghani operation.

The matured and well grown tree trunk required for the huge mortar, drive (load) beams, angler shafts became scarcer due to the general deforestation in the region. This has invariably escalated the cost of these material. The short fall in the fodder resources—owing to the large scale adoption of dwarf-stalk HYVs in place of conventional cereal crops and the cultivators' increasing preference for commercial crops like cotton and sugar cane - pushed up the fodder prices and in turn the cost of cattle maintenance. For the chettiyars this meant a steep hike in the costs of bullock ghani operations.

These apart, the wide fluctuations in productivity, production, supply and in the price of oilseeds during the last ten years invoked a large scale speculative element in their market behaviour. As a result, the chettiyars have been forced to procure a large proportion of their oilseeds requirement during the harvest times and operate on higher inventory ratio. This too has enhanced the working capital commitment of the chettiyars.

All these factors have eroded, substantially, the economic viability and competitiveness of the bullock ghanis vis-a-vis the baby expellers. About one-third of chettiyars in the village gave up the profession of oil crushing and an even proportion of them relegated it to a casual, part-time vocation. Only a small number of them continued in the profession. Of course, what has happened to the chettiyars in Kumaraswamy Palayam has happened, though in varying degrees, to all the bullock ghani oil men in the country.

#### The Power ghani

Discerning this perceptible decline in the village oil industry, the Khadi and Village Industries Commission (KVIC) took up several endeavours to augment

the industry. One such measure was the improvement of productivity in ghani operation. Through one of its Research & Development organizations viz., Jammalal Bajaj Central Research Institute (JBCRI), Wardha, it had improved the design and quality of bullock ghani during the 1960s. However, the bullock which remained as a major cost factor could not be eliminated in the oil processing operation. As such, the improved bullock ghani hardly made any dent in the field. However, the development of an appropriate power drive structure in late 60s, replacing the bullock, had emerged as a technological breakthrough in the village oil industry. Thus, power ghani had come off in a big way as an alternative to the bullock ghani.

#### Technology of power ghani

The power drive dispensed completely with the bullock, load beam and the supporting wooden shafts of the conventional bullock ghani. The pestle of the new ghani was fitted into a set of compact overhead power drive. The power drive consisted of clamps, shafts, gears and pullys with ball bearings and other accessories, (see Exhibit-1). The pully shafts were connected with a 2 HP electric motor. The motor power, through the above set, drives the pestle. The entire set of power drive, including the motor, was built overhead on four slender wooden/metal pipe shaft beams, erected on the ground close to the motor. Down the power drive, the motor was pitched three feet deep in a RCC bed. This concrete bed was felt necessary to withstand the continuous vibrations the ghani experiences in the course of operation.



The system, though quite compact, had a built-in elbow room for necessary change mechanism in the operation of the ghani, particularly in controlling the pestle speed and thus maintaining the desired pressure inside the ghani. These apart, the power ghani took less operational time (less by about 40%) as compared to the conventional bullock ghani. This helped the operator enhance turnover, especially during the peak season. The ghani was operable for over 20 hours a day, round the year and thus differed substantially with the conventional ghani whose operation was conditioned by the health of the bullocks, availability of bullock driver, good weather etc. Also, the new ghani required just one-third the working space needed for the bullock ghani. What was more, the power ghani gave two to three percent more of oil recovery.

#### National program for the multiplication of power ghanis

Encouraged by the extensive field test results, the KVIC decided to take the power ghanis in large number to the field. To this end, the Commission drew up, keeping its financial, organizational and manpower resources and its policy priorities in view, a national programme.

This programme envisaged the State Khadi & Village Industries Boards (SKVIBs) to identify, through their field level functionaries, the target beneficiaries and execute the programme. The KVIC was to bear, through grants and loans, about 80 per cent of the fund commitment required for the beneficiaries to adopt a power ghani. The remaining 20 per cent was to be borne by the beneficiaries themselves.

The financial assistance was given both for capital expenditure and working capital purposes. The capital loan of about Rs 5,500 was given to enable the beneficiary to acquire the power drive and cement needed for the construction of workshop. A major part (about two-thirds) of this loan was provided in kind component, with KVIC itself supplying these material. The working capital loan, given in cash, had the maximum limit upto Rs 10,000. A sum of about Rs 500 was provided as grant to the beneficiaries. Both the loans carried an interest rate of four per cent. While the capital loan was to be repaid in 10 annual instalments commencing from the end of the second year, the working capital loan had to be repaid in five yearly instalments.

The power ghani recipients were required to provide financial security to the tune of twice the amount of loan funds provided to them. Thus, a beneficiary receiving Rs 5,500 as capital loan and Rs 7,500 towards working capital loan had to provide a financial security to the extent of Rs 26,000. Another salient feature of the assistance pattern was that these loans could be granted only against the beneficiary's own property as security. Third party and collateral securities were not to be considered.

The loaning functions - such as ascertaining the creditworthiness of the beneficiaries, advancing and recovering the loan funds - were to be undertaken by the SKVIBs with their field level institutions. For operational convenience, the SKVIBs were delegated enough functional autonomy. This was to enable them to appropriate all the financial commitments relating to the programme from the annual budget funds allocated to them by KVIC. The KVIC, of course, had persuaded the nationalised commercial banks to finance the power ghani programme under their schemes. Lately, it even

decided to reimburse the banks the interest borne by the beneficiaries. Yet, none of the banks embarked upon this programme.

### TNSKVIB

In Tamil Nadu, power ghani programme was executed by the Tamil Nadu State Khadi and Village Industries Board (TNSKVIB). The TNSKVIB took a number of institutional and even informal measures in executing the programme expeditiously. The Board, through its district and field level functionaries, acted as a catalyst to help obtain the land and other property encumbrance documents and certificates from the revenue offices, portland cement from the civil supplies department, industrial licences from the industry department; sales and other tax exemption certificates from the tax authorities for the beneficiary applicants. It has also used its goodwill institution to expedite the power connection grant procedures with the State Electricity Board.

Till 1978, the TNSKVIB was to procure the power drive sets from one of the KVIC's production units in Ahmedabad (viz., Amber Saranjam Bhandar, Saraspur, Ahmedabad). This meant a substantial delay ranging from 6 to 9 months in receiving the machinery and, in turn, in delivering them to the beneficiaries. In a measure to expedite this event, the TNSKVIB negotiated exclusively with KVIC and a State owned industrial unit viz., Tamil Nadu Small Industries Corporation (TANSI) and motivated the latter to undertake the manufacture of the power drives for it. By and large, this step was a paramount contribution the TNSKVIB made to the programme. It had distributed, by March 31st, 1980, 2278 powerghanis in the State, accounting for nearly one-fourth of the total sets distributed in the country (see Exhibit 2).

The Periyar District Village Industries Directorate (PDVID)

The Periyar District Village Industries Directorate, under whose patronage the chottiyara in Kumaraswamy Palayam fall, was one of the field level institutions implementing the programme. The PDVID functioned as a lineal functionary under TNSKVIB. The Directorate was entrusted with the responsibility of implementing development programmes concerning over 14 village industries. The power ghani programme was only one among them. The directorate, headed by an Assistant Director, had half a dozen administrative personnel and three field staff. These staff took the help of the Block Development Officers and made a survey of the potential village industries, identified the target beneficiaries and provided them required technical guidance. They also made periodic supervisory field visits and undertook loan recovery operations. With these staff, the directorate administered the financial, raw material and market assistance measures of the development programmes. Further, it also undertook the training and demonstration operations to the target group and functioned as a feedback channel between the beneficiary group and the TNSKVIB. However, for the PDVID, lack of adequate manpower did not seem to be a constraint in implementing the power ghani programme. By the end of March 1980, it had sanctioned 191 powerghanis and delivered 152 sets of them in the District. The real hurdles to the programme seem to have come from other corners (see Exhibit 3).

Of the 151 sets delivered to the applicants, only 66 ghanis were erected in the field. Thus, a large number of them awaited installation. Lack of power connection to the beneficiary household and delay in procuring cement from the civil supplies authorities were the **prime factors** responsible for

this delay. In most cases, the need to study the feasibility of load (electric power) enhancement and installing new/additional transformers on the part of the State Electricity Board delayed the power connections. And a few of the sets awaited the RCC base to cure for erection. And, of the 66 power ghanis erected only 30 were found functioning. Shortage of working capital and non-availability of raw materials were responsible for this anomaly. However, the PDVID officials felt that this had been only a temporary snag, resulting due to the unprecedented short fall in the oilseed production during the year. They were extremely confident that the position would improve soon.

But, 39 ghanis, sanctioned duly, had not been taken possession by the applicants. These, thus, remained with PDVID for over one year. A detailed inquiry revealed that during the initial years of the programme, some well-to-do individuals who were really not keen in acquiring a ghanis applied for the same. They hoped that they might receive a major part of the loan in the form of cash. Later on, realising the contrary, they chose not to take possession of the sets. Some of them pretentiously pleaded with the PDVID to provide them more time for taking the ghanis. The PDVID, however, demanded after the lapse of about six months, the applicants to take possession of the ghanis in a given time failing which it would forfeit the sanction orders. It now planned to distribute these ghanis to the genuine beneficiaries.

#### Distribution of power ghanis in Kumaraswamy Palayam

Under the power ghani programme, seven chettiyar households in the Kumaraswamy Palayam received power drives. And, about a dozen of their families had still been operating on the bullock ghanis. The rest of them had either given up

the oil processing profession once for all, or had reduced their bullock ghani operations to bare casual vocation. Most of the households had taken up agricultural labouring while a small number of them joined the well-to-do power ghani holders as ghani drivers, earning their day wages. The programme could be seen well from the following individual cases.

#### Individual cases

##### A) Mr Chellappan

Mr Chellappan (38), a high school educated, was one of the few articulate members of chettiyar families in Kumaraswamy Palayam. He had a couple of acres of irrigated land, a tile house and a pair of bullocks. He applied for the power ghani along with 15 other members early in 1977. And, without much difficulty, he could furnish the security for both capital and working capital loans in October 1977. He was sanctioned a power drive and the working capital loan in March 1978. He was given a set of Ahmedabad made power drive in December 1978 and half-a-quintal of portland cement in June 1978. He could get the power connection with much lesser difficulty. Of course, other power ghani recipients too got the power connection along with him. The PDVID staff visited him and installed the power drive and ghani in February 1979. Chellappan, on the advice of the PDVID staff visited, for observation, a similar ghani functioning fairly well in a different village in the adjacent district. He was frequently guided by the supervisory staff after installation.

In another six months, Chellappan also purchased, for a lumpsum, another power ghani from a young graduate in Salem (neighbouring District) who was

allotted the same under the programme. The young man cleared all the loan liabilities to the TNSKVIB and took up a government service. From the Board's end, it was not objectionable for Chellappan to purchase the ghani.

He had reconstructed the overhead power drive with the help of a mechanic in Erode so as to operate both ghanis with a single motor. As a contingency measure against the frequent load shedding and power cuts\*in the region, Chellappan installed a diesel engine (Rs 3000). He hired two ghani-drivers, who by profession belong<sup>to</sup>/the oil processing community, from the village. These drivers were paid ten rupees each a day. Two of Chellappan's family members also did the minor operations such as pre-processing and sundrying the oil seeds. He supervised the processing operations, procured the oil-seeds, marketed the oils and cake, collected the payments and attended to any dealings with the institutions. These apart, he occasionally traded the oilseeds, oils and cake on a commission basis for the fellow chettiyar members in the village. The sales tax exemption privilege extended to him under the power ghani programme helped him in these operations though it was quite illegal for him. And most often, the bullock ghani operators looked upto the resourceful Chellappan for favours in trading their produce.

\* With Erode growing fast into an industrial city the demand for power had been outstripping the supply. This resulted into frequent load shedding in several zones. The year 1979-80 being a bad monsoon year, the need of power for lift irrigation too increased, further accentuating this phenomenon.

With electricity tariff for power ghani operators brought down by the State Government .. as an encouragement to the power ghani adopters - from Rs 0.34 to 0.14 per unit, from November 1, 1980 - the per unit oil processing cost to Chelleppan declined steeply. He incurred a cost of Rs 1.63 per kg. of oil processed and earned a net income of Rs 0.62 per every kg. of oil he processed (See Exhibit 4).

Assuming about 180 working days in a year with each day processing 112 kg in one ghani alone, Chelleppan earned Rs 5,285 per annum, at conservative estimates. With family members' labour imputed, his annual income was of the tune of Rs 9,425. Thus, he would easily be in a position to clear the loan liability to TNSKVIB in the stipulated span of time.

B) Mr Viswanathan

Mr Viswanathan (25) belonged to the group of bullock ghani households which numbered to 15. He had a small thatched house, a pair of bullocks worth Rs 1,500 an acre of dry land and an old bullock ghani, which all together have a market value of about Rs 15,000. Viswanathan operated on the ghani for nine hours a day - from 5 to 10 AM in the mornings and from 3 to 7 PM in the evenings - and processed about 85 kg of oilseeds each day. On average, he worked for about 90 such days in a year. The cost of processing for him worked out to rupees two per kg of oil (see Exhibit 5). At these estimates, he earned Rs 550 per annum. If the cost of labour is also imputed, his annual income from ghani operations were Rs 2,170. Viswanathan was one of the 25 applicants for power ghanis in the village. However, with only seven applicants sanctioned the ghanis, his case received low priority due to the inadequacy of loan security he could provide. He



and some of the non-allethees had repeatedly urged and persuaded the PDVID to reconsider their entreaty.

However, members close to Viswanathan feel that he was quite resourceful enough to purchase a power ghani through the open market\* if it were available. He could borrow without much difficulty from his relatives' circle if he had to fall short of funds. For two reasons he seemed to have turned down this proposition and preferred to have the ghani through the TNSKVIB. First, under the latter's programme, he would enjoy the privilege of sales and other tax exemptions. Second, he would get a loan facility bearing a mere four per cent which compared highly favourable with the prevailing interests rates (which range from a minimum of 18 per cent to 36 per cent) in the region. These two privileges would certainly not be available to him otherwise.

C) Mr Palani:

Mr Palani (29) inherited an old bullock ghani and a small hut as his share of property. He hired, whenever necessary, a pair of bullocks at rupees three per charge (a charge took  $1\frac{1}{2}$  hours). Unlike Mr. Chellappan and Mr Viswanathan, his ghani operations were mainly based on job-type confining to a couple of months during the peak seasons in the year. Thus, his earnings from oil processing were quite marginal.

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\*Some of the articulate members in the village felt that industrial firms at Coimbatore (a neighbouring district) could fabricate powerdrives similar to that of KVIC model on a job order.

Non-beneficiaries

All of the bullocks ghani holders in the village had pleaded a minister in the State Government (who paid a formal visit to the region in November 1979) to grant each of them a power ghani. The minister had directed the District Collector and PDVID functionaries and the bank officials to reconsider the possibility of providing them the power ghanis.

Necessarily, the PDVID functionaries visited the village soon and collected more information from the applicants. However, the Assistant Director of PDVID later felt that under the existing policy directions served to him, he could not sanction them the ghanis. According to him, a suitable policy modification from the TNSKVIB's end enabling the functionaries to consider a lower sum of security towards the loan was necessary. A policy change was also necessary if power ghani loans were to be granted against the group surety. And, according to the TNSKVIB, this policy direction had to come from the central office, the KVIC.

The experience of the Assistant Director of PDVID has been that he could not succeed in impressing upon the banks, too, to advance loans to the power ghanis applicants. Yet, even with the present policies, the TNSKVIB had enough elbowroom to grant these loans to a cooperative society if the target beneficiaries formed one such organization. Despite this, according to the functionaries of TNSKVIB, the experiences in such developmental measures involving the cooperatives had been quite disheartening.

## Conclusions

From the foregoing case the following conclusions are obvious. R&D skills and resources could be successfully geared to improve the productivity of cottage scale technology employed traditionally for processing oil seeds. But, in transferring the improved technology to the target adoptors the technology transfer policy formulating agency (TTPFA), in this case KVIC, has been guided by the sheer resource position and hence creditworthiness of the target population as criterion for identifying the beneficiaries to receive its patronage in terms of loans at subsidized rate of interest. Under such policy, only those people having resources adequate enough to provide security against the loan funds could benefit. With the improved technology, the unit costs of their operations have declined as compared to those employing traditional technology (bullock ghani). The State Government's policy of subsidizing the cost of power consumed by the improved technology adoptors as an incentive measure to encourage the pace of adoption has brought down the unit processing costs further vis-a-vis the costs of traditional processing. This cost disparity meant a strong competition for the bullock ghani operators. In due course, the market forces have displaced this disadvantaged group. The case reveals that some of those who were thus displaced from their self-employment status accepted day-wage jobs with those who adopted the new technology successfully and eventually expanded their operational capacity. In otherwords, the introduction of improved technology has rendered poor entrepreneurs loose their self-employment position and become wage earners while it has strengthened the position of the new technology adoptors. Thus, it becomes imperative for the TTPFA to look deeper into and even anticipate the potential spill

over effects of the new technology among the target beneficiaries before it finalises its policies and draws out implementation programmes. Technology transfer should not be considered per se as an end in itself. Nor, should it be looked in isolation. It should be regarded as only a potential means to improve the productivity and hence earnings of its adoptors.

The government should consider it worthwhile to do a kind of social engineering to build and promote institutions like cooperatives/collective organisations which are crucial for taking the benefits of the new technology for it is often expensive and thus beyond the reach of poorer sections among target beneficiaries. Another significant observation made in the foregoing case is that the TT programme implementing agency has fallen short of staff. Such infrastructural inadequacies are clearly constraints in the speedy implementation of programmes.

It has also been noted that the TT programme implementation agencies lack enough operational autonomy to take the local factors and situations into consideration in playing its role. For instance, if the above agency in the foregoing case was empowered to advance power loans on group security loans, instead of rigidly adhering to the TTPFA's norms of granting loans against the beneficiary's individual security, it would have been in an easy position to take the new technology to larger number of poorer individuals of the target population. This underlines the need for granting adequate operational autonomy to the implementing agency enabling it modify the operational policies and procedures at the field level. Poor response from the commercial banks toward the implementation of TT programmes characterizes their rigid nature toward their jobs and inability to show innovative lending attitude towards development programmes.

Exhibit 1

Parts of Power Ghani

<u>Sl.No.</u>	<u>Name of the part</u>	<u>No.of units</u>
1	2 HP Electric Motor	1
2	Starter	1
3	Motor railings	2
4	Flat pully	2
5	Loose pully bush	1
6	Counter (V) pully	1
7	Motor pully	1
8	Cast iron collar	2
9	Pedastal	4
10	Vertical shaft	1
11	Shaft with penion	1
12	Pinion stand	1
13	Crown gear flange	1
14	Crown gear	1
15	Pin for crown gear flange	1
16	Pin for hanger pipe	1
17	Pin for ball bearing housing	1
18	Pin for pressure screw	1
19	Counter pins	4
20	Cross lever	1
21	Hand Lever	1
22	Braket	1
23	Ball bearing housing with cover	1
24	Cost iron cover	1
25	Pestile cap	1
26	Flynut with arms & knobs	1+4+4
27	Pipe for protecting screw & washer	1+1
28	Hanger pipe	1
29	Pressure screw	1
30	Main housing and cover for main housing	1+2
31	Bottom plate	1

Exhibit 2

No of power ghanis distributed in the  
country and in Tamil Nadu till 1979-80

Year	No of power ghanis distributed in	
	the country	Tamil Nadu
1971-72	115	NA
1972-73	726	NA
1973-74	1470	NA
1974-75	1276	NA
1975-76	507	NA
1976-77	1430	NA
1977-78	579	NA
1978-79	1041	NA
1979-80	2198	NA
Total	9302	2278

Exhibit 3

Progress of power ghani distribution programme  
in Periyar District till the end of March 1980

1.No.	Particulars	No.
1	Powerghanis sanctioned	191
2	Powerghanis received at the PDVID office	191
3	Powerghanis distributed	152
4	Powerghanis installed in the field	66
5	Powerghanis operating in the field	30

Exhibit 4

ECONOMICS OF POWER GHANI OPERATION:  
MR CHELAPPAN'S CASE

Reference period:  
December 1980

A. Fixed Costs

<u>a) Depreciation</u>	Value	Life in years	Annual Depreciation
i) Wooden mortar (ghani)	Rs 200	2	100
ii) Wooden pestle	Rs 50	2	Rs 25
iii) Power drive (including 2HP motor)	Rs 4800	10	Rs 480
iv) RCC base structure	Rs 500	5	Rs 100
v) Work shed	Rs 5000	20	Rs 250
vi) Installation charges	Rs 150	10	Rs 15
	10700		Rs 970

b) Interest

Interest payable to TNSKVIB	
@ 4% on Rs 5,500	Rs 220
Interest to be borne on the balance of capital commitment	
i.e. Rs 10,700 - Rs 5,500 = Rs 5200	
@ 24 per cent	Rs 1248
Total interest	Rs 2438

B. Semi Variable costs

a) Costs of working capital

i) of Rs 15,000 advanced by TNSKVIB @ 4%	Rs 400
ii) on balance of Rs 6,000 @ 24%	Rs 1440
	Rs 1840



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C. Variable Costs

a) Raw materials (groundnut seeds)

8 charges of 14 kg each  
per day = 112 kg  
For 180 days = (112x180) = 20160 kg  
@ Rs 4.80 per kg Rs 96768

b) Labour

1 powerghani drivens @ Rs 10 each per day  
for 180 days = (1x10x180) = Rs 1800

1 Family Labour @ Rs 8 each per day  
for 180 day (1x8x180) = Rs 1440

Mr Chellappan's opportunity cost of labour  
@ Rs 15 each per day for  
180 days (15x180) = Rs 2700

c) Indirect costs

i) cartage @ 2% on the value of raw  
materials  $2 \times \frac{1}{100} \times 96768$  = Rs 1935

ii) Power @ one unit per charge i.o.  
Rs 0.14 per 14 kg of charge  
oilseeds for 20/50 kg Rs 202

iii) Repairs @ 5% on fixed capital Rs 535

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2,672

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D. Total cost of Production

Fixed Costs	Rs 3408
Semi variable costs	Rs 1840
Variable costs	Rs 105380
Total cost of production:	Rs 110,682

E. Sales Realisation

i) oil\* @ Rs 12 per kg

8520 kg Rs 102,235

ii) cake @ Rs 125 per kg

= 11398 kg Rs 136,78

Rs 115,913

F. Returns

Sales realisation - cost of Production

= Rs 113913 - Rs 110.628 = Rs 5285

Processing cost per kg oil =  $Rs \frac{13,860}{8520} = Rs 1.63$

Profit per kg oil =  $Rs \frac{520}{8520} = Rs 0.62$

G. Annual Earnings

i) When family labour cost is imputed

a) Net returns	Rs 5285	Rs 5,285
b) Chellappan's Wage earnings		Rs 2,700
c) Chellappan's family member's wage earnings		Rs 1,440
		<u>Rs 9,425</u>
Total Annual earnings		Rs 9,425

ii) When family labour cost is  
not imputed

Net returns	Rs 5,285
	<u>Rs 5,285</u>
Annual Earning	Rs 5,285

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Notes :

- £ The computations refer only to the power ghani given to Mr Chellappan by TNSKVIB under powerghani programme
- \* The oil recovery rate has been estimated at 42.26 per cent and the cake recovery at 56.54 per cent. The rest 2% is provided against the loss of weight in the course of processing.

Exhibit 5  
 ECONOMICS OF BULLOCK GHANI OPERATION:  
 MR VISWANATHAN'S CASE

Reference period:  
 December 1980

A. Fixed Costs

a) Depreciation

	Value	Life of asset in years	Annual Depreciation
i) Wooden mortar (ghani)	Rs 500	3	Rs 167
ii) Wooden pestle	50	2	25
iii) Wooden drive beam and supporting shafts	150	3	50
iv) Carpenter's charges and installation expenditure	100	3	33
v) Bullock harness	50	2	25
vi) Workshed	<u>3000</u>	20	<u>150</u>
	Rs 3850		Rs 450

b) Cost of bullock maintenance

i) Cost of a pair of bullocks	Rs 1500
ii) Per day expenditure (@ Rs 10, less Rs 3 as cowdung) 7x365	= Rs 2555
Approximate cost of maintenance for 70 days	Rs 630
iii) Interest	
on fixed assets @ 24%	
on Rs 3850	Rs 924
on investment on bullock @ 24% on Rs 1500	Rs <u>360</u>
	Rs 1284

B. Semi Variable cost

Cost of working capital of  
 Rs 5000 @ 24%      Rs 1200

C. Variable costsa) Raw materials (groundnut)

6 charges of 14 kg each per day, for 90 days (= kg 7560) @ Rs 4800 per kg of groundnut	Rs 36,288
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b) Labour:

i) View opportunity cost @ Rs 10 per day	Rs 900
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ii) Another family member's opportunity cost @ Rs 8 per day	Rs 720
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c) Indirect costs:

i) cartage @ 2% on the value of raw materials ( $2 \times \frac{1}{100} \times 36288$ )	Rs 726
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ii) Repairs @ 3% on the fixed assets	Rs <u>116</u>
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	Rs 842
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D. Total cost of Production

Fixed costs	Rs 2304
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Semi Variable costs	Rs 1200
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Variable costs	Rs <u>38750</u>
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Total cost of Production	Rs 42315
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E. Sales Realization

i) Oil* @ Rs 12 per kg. (3024 kg x 12)	Rs 36288
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ii) Cake @ Rs 1.50 per kg (4385 kg x 1.50)	Rs <u>6577</u>
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	Rs 42865
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F. Returns

Sales realization - cost of production = Rs 42,865 - Rs 42,315 = Rs 550

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Processing cost per kg. oil = Rs 6327 ÷ kg 3024 = Rs 2.10

Profit per kg. oil Rs 550 ÷ kg. 3024 = Rs 0.19

G. Annual Earnings

i) When family opportunity cost's imputed

a) net returns	Rs 550
b) Viswanathan's wage earnings	Rs 900
c) Viswanathan's family member's wage earnings	<u>Rs 720</u>
Annual earnings	Rs 2170

ii) When family opportunity cost is not imputed

net returns	<u>Rs 550</u>
Annual earnings	Rs 550

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Notes: The oil recovery rate has been estimated at 40 per cent and the cake recovery at 58 per cent. The rest 2 per cent is provided against the loss of weight in the course of processing.

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