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Rural Women: Their Integration in Development
Programs and How Simple Intermediate Technologies
Can Help Them

by: Elizabeth O'Kelly

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RURAL WOMEN: THEIR INTEGRATION
IN DEVELOPMENT PROGRAMMES
AND HOW SIMPLE INTERMEDIATE
TECHNOLOGIES CAN HELP THEM

ELIZABETH O'KELLY

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By **ELIZABETH O'KELLY**

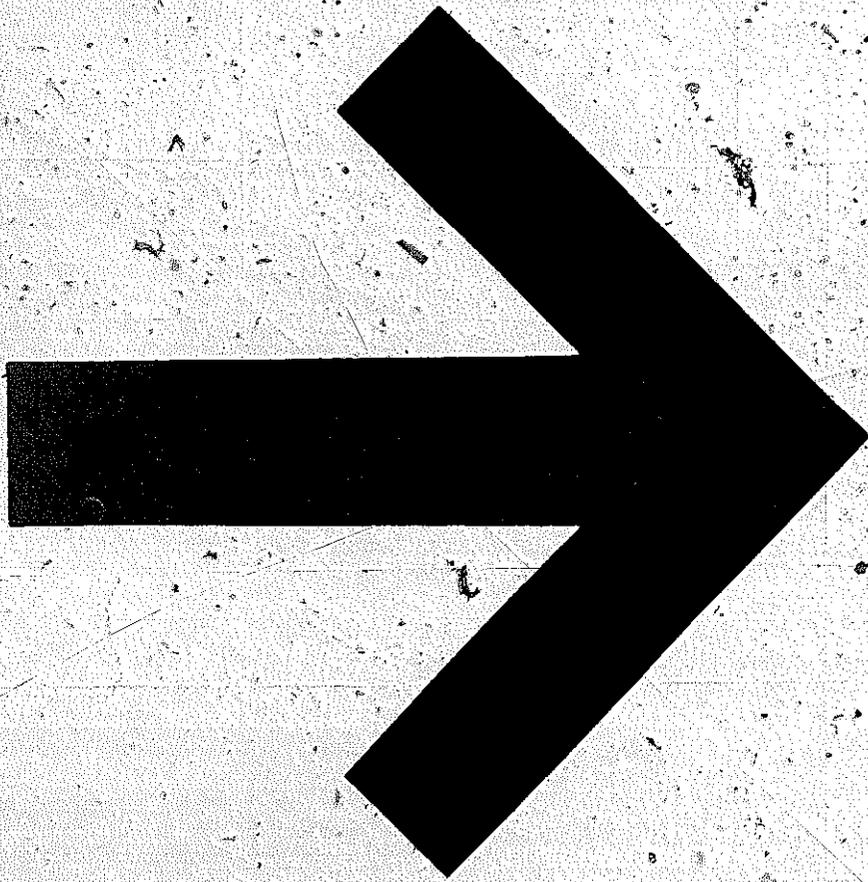
**RURAL WOMEN: THEIR INTEGRATION IN
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CAN HELP THEM.**

ELIZABETH O'KELLY

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Foreword

The rural women, in the developing countries, are accustomed to existing quietly in the background, with the result that the important part they play in both food production and processing, as well as in other village activities, is all too often overlooked by administrators of rural development programmes. This book is an attempt, therefore, in a small way to place on record what the rural women in both Africa and Asia actually do and to suggest means by which they can be helped without changing their present way of life too drastically — and to their disadvantage. In particular, it endeavours to show how Intermediate Technologies could be of help to them. It is confined to these two continents because it is based on personal experience in the field, but the pattern of life in rural areas everywhere is very similar, and much of what has been suggested here should be applicable elsewhere.

The book does not aim to show how to carry out the technologies suggested but lists manuals which will give this information in the Appendix. A list of manufacturers and their addresses is also included, as well as a list of the many organisations now working in the field of Intermediate/Appropriate Technology in both Africa and Asia.

ELIZABETH O'KELLY

CHAPTER I

The Developing countries

There are some people who, however fluently they may learn to speak another language, never get the actual "feel" of it. Their French, or whatever language it may be, remains essentially English in thought and idiom. A nice example of this occurs in a phrase book published in India during the last century and entitled "Correct English Phrases for Urdu Speakers". One of the first of those given is "God save the Queen! Short shoes and long corns to her enemies!" A concept very Asian in thought even when expressed in English.

It can be much the same with development programmes, planners tend to think only in terms of what is familiar to them and this is especially true in respect of technological programmes where, in many cases, instead of introducing new technologies from outside it would be far better to adapt, or improve, those already in use. This would require a greater adjustment on the part of the administrator, however, than he, or she, is always prepared to make. It takes a great effort of the imagination to see something through another person's eyes. In general, however, technologies will be more readily accepted by rural people if they have evolved naturally from ones with which they are already familiar, too often now these conflict with the existing way of life, and, in the case of the women, sometimes end in displacing them.

Before discussing ways and means by which rural women can play their part in development programmes it is perhaps necessary, however, first to define which countries are today still classified as "developing". There have been many attempts to do this, ranging from the cultural/sociological point of view to mere size but the term "the Third World", which is often used as if it were synonymous with "developing", was, in fact originally coined to refer to those countries which are politically unaligned with either the Eastern or Western blocs and so, logically, must include both Austria and Switzerland, neither of whom can be described as underdeveloped.

The most usual criteria adopted, however, is the per capita income although it can be argued that this does not give an entirely accurate picture of conditions in the country concerned. An income of less than a 100 dollars a year, for example, may indeed mean dire poverty in the West, and even for those persons in the developing countries who are living in the towns and must buy all their own food and pay rent for their houses, but the situation is somewhat different in the rural areas where communities are far more self sufficient. There, people still grow their own food and build their own houses from local materials and obtain the few things they cannot make for themselves by bartering their surplus produce. They pay for any services rendered

in kind rather than in cash and therefore have very little need for this — or did not have until the pressure of Western advertising has brought them to believe, 'that proprietary (and expensive) 'brands of baby food' are better than breast feeding and that transistor radios are essential to the good life. So much foreign exchange is said to have gone in importing champagne into one West African country that the Government there has now made it an offence to possess this.

In 1971 the United Nations used the per capita method of classification to designate the 26 poorest countries in the world, that is to say, those in which the income a head is less than 100 dollars a year, and the literacy rate (for persons over 15 years of age) less than 20% of the population. These countries are:-

Africa		Asia	
Guinea	Uganda	Tanzania	Yemen Arab Republic
Mali	Burundi	Malawi	Afghanistan
Upper Volta	Rwanda	Botswana	Nepal
Benin	Ethiopia	Lesotho	Sikkim
Niger	Somalia		Butan
Chad	Sudan		Laos

and:-

Western Samoa

The Maldives

Haiti

Bangladesh has been added to this list since then and it will be seen that the only country situated in the Western Hemisphere is Haiti. These are not the only developing countries, of course, but are certainly the ones in greatest need.

It should be remembered however, that a number of these countries have histories going back for many hundreds of years, of which they are rightly proud, so that it is only in the economic sense that they can be described as "developing". Ethnically, linguistically and culturally these countries differ as much from each other as we do in the West and may range in size from Sub continents like India, with a population of 531 millions, to relatively small islands such as western Samoa. They have however, one thing common to them all; the fact that their development is all too often hampered by circumstances over which they can have little, or no, control. It is no coincidence that so many of them are situated in the Eastern Hemisphere, where repeated natural disasters in the form of earthquakes and cyclones, floods and drought adversely affect their economies through no fault of their own; — as they would do ours if we were subject to the same conditions.

Nor should all the developing countries be thought of as being necessarily backward, technologically speaking, indeed; in the Middle Ages, the Chinese, Arabs and Indians were in advance of Europe in this respect. The Indians, invented the concept and symbol of zero in the 6th century; A.D., and they, and the Arabs were responsible for our present system of numeration, which, at the time that it was introduced was an immense step forward from the much clumsier system of Roman numerals we were then using, whilst the Arabs led the world in those days in both Astronomy and Alchemy. The Moors irrigated large parts of Spain, when they occupied that country in the 8th century, and it was they who were responsible for the spread of various types of water wheel throughout Europe. The Chinese were using rotary threshers, and fans and silk weaving machines, as far back as the 1st century

B.C., and they had invented paper making by the 1st century A.D. By the 12th century they were using gun powder to propel rockets and had also invented movable type and the floating magnet, which later became the compass. Wheelbarrows, gimbals and tilt hammers are all Chinese inventions: horizontal windmills were in use there, and in Persia, in the 7th century A.D., and iron casting was being carried out as far back as the 4th century—as was also the technique of drilling.

It was the successful invention of the steam engine in Britain, in the early 18th century, which changed all this. The so-called Industrial Revolution which followed was, in fact, a power revolution. It led to the manufacture of cheap, machine made, mass produced goods with which the overseas craftsmen could not compete, so that these were forced out of business. But the skills that these craftsmen possessed are still there in many cases and could be revived to support a development programme. It is the lack of money, and sometimes of materials also, which is more often the stumbling block, especially in Asia, than the lack of "know how" or craftsmanship.

The historical factors which have led the West to be so dependent on machines are also absent in most of the developing countries, even today. When the farm labourers left the land to work in the cities in the factories which steam power made possible, the farmers, with a reduced labour force, were compelled to turn to machines if they were to be able to grow sufficient food to feed what was now a largely industrial society, and the development of the great open spaces of North America only became practicable with the invention of the tractor and the combine harvester. With the introduction of these machines, however, agriculture became men's work in the West.

But the situation in the developing countries is very different from this, there the need is to find employment for the many who, without it, will go hungry. It is for this reason, not technological backwardness, that countries such, as India and China prefer to use many thousands of men and women to carry out projects for which we would use giant earthmovers and bulldozers. In such circumstances, a capital intensive, highly automated plastic shoe factory is of doubtful benefit to the economy if it puts out of work several thousand craftsmen who formerly made these shoes by hand. And a factory to manufacture artificial stone is likely to be welcomed only by road engineers where many of the poorest and least skilled of the population earn their living breaking up mis-shapen bricks for use in the roads.

It is important, however, that a saving of unnecessarily arduous labour should not be confused, as it sometimes is now, with a saving of man power. The latter is not usually desirable in the developing countries but the former is something which should be attempted whenever possible, we do not need to use a sledge hammer to crack nuts but we do need to find better ways of cracking them than with our bare hands.

This is particularly true where the women are concerned, much of their present back breaking toil could be relieved by well planned rural development programmes, as the following chapters seek to show.



(1) *Street scene in Afghanistan*

(2) *Turkish woman ploughing*



CHAPTER 2

The part women play in Agriculture

Although an increasing "number of women from the developing countries are now studying in Colleges & the West these are mostly from the urban areas, and they often know very little about conditions in the villages. Opportunities for education are still few and far between in rural areas and, even where these do exist, girls are more often taken away than boys when they have reached an age when they can be of use in the home, or on the farm, so that very few of them reach College level. Muslim girls in particular, once they have reached the age of puberty, are not usually permitted to continue to attend mixed schools and there may not be, one exclusively for girls in their district. Because of this situation therefore, the women may not always be able to express their needs but this does not mean that they do not have them or that they are unaware of them. Illiteracy, when it is due to lack of opportunity, should not be equated with a lack of intelligence, the women know very well what they want but, because they have been conditioned since infancy to efface themselves, they do not always put their ideas forward, especially in a mixed assembly. In addition, the administrators of rural development programmes are usually men, and, as such, will be unlikely to be permitted to communicate direct with the women. The result of all this is that the part that women play in village life in general and in agriculture in particular, is consistently underestimated and many programmes are drawn up on the assumption that it will be the men who will be carrying them out when; in fact, it will be the women. An example of this occurred in one West African country when some coffee co-operatives were set up. The men were shown the correct depth to plant the seedlings but it was their wives who actually did this work and the men did not pass on what they had been told to them. As a result, the coffee eventually died because the holes in which the seedlings had been planted were too shallow so that the tap root had been bent. If the extension workers had dealt with the women in the first place, this disaster could have been avoided but custom, and, no doubt also preference, dictated that, as men, they dealt only with men.

The division of labour between the Sexes is also quite different in many countries to that to which we are accustomed in the West, and failure to recognise this can lead to many difficulties. Men may wash the clothes, which we in the West think of as women's work but women will carry the heavy loads, which we think of as men's. In particular the women play a far more important role in farming than is always recognised. It is estimated that at least 52% of the women in Asia and between 60% and 80% in Africa are engaged in this and, in Africa subsistence farming (that is to say, the growing of food to feed the family) is almost entirely in their hands. Even where the women do not take such an active part in the actual farming they are responsible for the post harvest processing of food in almost every country, yet this.



(3) *Indian women harvesting a crop of wheat*

(4) *Threshing rice by hand in Rajastahn*



also often goes unrecognised because the work is usually carried out in the privacy of their own compounds, to which men, and strangers, are not generally admitted.

Although it conflicts with the pattern to which we are used there is very little wrong with the women playing such an important part in agriculture, they have been doing so, in many parts of the world, since the Stone Age. It was they who dug for roots to feed their families whilst their men folk were away hunting and it was they who tanned the skins the men brought back with them and made the clay pots used for cooking and for carrying water. It was quite probably a woman who first thought of using fire for cooking purposes and women who brought, about the gradual transition from a gathering, nomadic community to a settled, agricultural one by cultivating the wild grains growing around them, and this is the pattern which persists in many developing countries today.

As farmers, the women bring considerable expertise to their task, and achieve surprisingly high yields on their farms. Their main problem is that these are usually less than two acres in extent and are often scattered, so that they may have to walk a considerable distance every day to reach them.

Cash crops, however, are another matter. The growing of these is men's work because the element of money has been introduced and it is the man's duty to provide whatever cash the family may need to buy those things which cannot be obtained by barter. It is not always realised however, that the introduction of these crops (that is to say, of tea, coffee, cocoa etc) may often prove to be very much to the women's disadvantage; the man may take her land, if it is near the homestead, and expect her to go further afield to work what may be less fertile soil. He will also expect her to help him with his farm, as well as to continue to work her own, with the result that her work load will be greatly increased and her own output will be reduced. Since it is she that is growing the food to feed the family this can be very serious. In theory, her shortfall can be made good by using some of the money that the man has made from the sale of his crops to buy food in the market, in practice this is seldom possible because the market is dependent on the woman sending her surplus there and she has had none to send. The result can be a famine. A similar situation arises also, when large scale, commercial enterprises take over land formerly used to grow food crops and plant bananas and pineapples instead. This may bring employment to the village but it will mean that food has to be imported from outside and at enhanced prices.

The introduction of high yielding varieties of grain too can also make life difficult for the woman, she will have more to harvest, and more to process and more to carry to market but usually no extra help to do this.

Although the women play such an important part in agriculture in the developing countries, far too few agricultural colleges recognise this and, with one or two honourable exceptions, most agricultural extension workers are men, whom, as has been said earlier, are unlikely to be able to help the women even when they wish to do so. It is true that many of the women may lack the necessary educational qualifications, through lack of opportunity, but this is offset by their much greater knowledge of farming practice, and it should surely not be impossible to revise the curriculum to include more practical and less theoretical instruction so that they could also take part.



(5) *Carrying water in India*

CHAPTER 3

A day in the life of a rural woman on the Indian subcontinent

A typical day in the life of a woman living in a farming community in the rice growing areas of the Indian subcontinent will commence with the dawn, when she will prepare a meal for her husband, before he goes off to work in the fields, and then for her children. Finally she will eat herself, for she will rarely sit down with the other members of the family. As for the meal, it will probably consist of rice left over from the previous day and curry, or cooked and salted rice paste, or rice and pulses cooked together and, in winter time, it may include sweet potatoes.

When it is finished she will send the children off to school, or else out into the fields to keep watch on the cows and the goats whilst they are grazing – but only after she has milked them. Then she will clean out the cow and poultry sheds and fetch fodder and water for the animals.

At noon, she will prepare another, and more substantial, meal, for her husband and may possibly have to carry this out to him in the fields. This will probably include sour soup, pulses and fried greens. About midday, as this is a time when very few men will be in the village, she will take a bath in the village tank, or under the pump, and she may wash the family's clothes at the same time. Since their wardrobe will be small this usually has to be done every day, although the man may wash the clothes he has been wearing when he returns from his farm.

In the afternoon, after these other tasks have been completed, the woman will go to work in her kitchen garden, where she will grow the spices, fruit and vegetables needed to feed the family. The spices used in her cooking will be freshly ground every day and will help to preserve the left over food, even in the hottest weather. She will dry any surplus fruit and vegetables in the sun to preserve them, as well as other things she will have grown such as chillis, turmeric, garlic and ginger, and will keep these in the house in tightly sealed containers. She will also make molasses, by crushing and boiling the sugar cane or by tapping the juice of a date palm and she will obtain oil from linseed and other oil seeds. She will often keep hens, and sometimes ducks, and she is generally allowed to retain any money she may have made from the sale of their eggs.

During the monsoon period, when the rains will make it difficult for her to work outside, she will concentrate on making embroidered bed quilts and cloths and floor mats for the use of the family. She will also make whatever she, or her husband, may require in the way of baskets, winnowing trays and sieves, using split bamboo for these, which will also be used to make articles of furniture. She will make ropes and fishing nets, brooms and hangers, from jute, grass, rice straw, or coconut fibres and she



(6) Pounding paddy with a pestle and mortar



(7) Making a mud stove on which to parboil rice

(8) Drying grain on the roadway in Bangladesh



will make necklaces for wear, and for sale, out of nuts and shells; also small clay figurines, which she will paint in bright colours made from locally gathered herbs. She will use fish scales, coconut shells, beads, buttons and palm leaves for embellishment.

In the evenings, throughout the year, after cooking the third meal of the day, she must round up the cattle, feed, milk, and water them, shut up the poultry where they will be safe for the night and tie up generally before going to bed, which, except on moonlight nights, will usually be not long after dark because the only light she is likely to have will be a small clay lamp or tin in which a piece of wick will be floating in some vegetable oil.

The foregoing describes the way of life of the majority of the women in a village but there is another class of women, the widowed or divorced, who till probably have to earn their own living and the only way that they are likely to be able to do this will be by hiring themselves out as field labourers to the richer farmers or by working as domestic servants. These are usually the only women to be seen working regularly, in the fields in Islamic countries, since custom dictates that the others must remain in, or at least near, their compounds, and the); will be fortunate if they have been able to build themselves a small hut from waste materials and will certainly not have any land of their own on which to grow their food.

The work schedule described might seem a sufficiently full one to most of us but, in fact, does not include the most time consuming task of them all, the processing of the foodstuffs grown for the family's consumption, or, in the case of the poorer women, of, the crops grown by the larger landowners in the district, for whom their husbands have probably been working as labourers.

The women will begin, during the winter, by collecting suitable clay for the threshing floor which they will &e in a corner of their compound until it is needed. When the harvest is nearly ready they will take this clay and soak it and, when it is of the right consistency, mix it with fresh cowdung and then spread it over the floor of the compound — after first having levelled this. They will usually need to repeat the same process the next day. The actual threshing may be carried out by the men, at any rate when bullocks are employed to tread the grain, but the women will assist them, and all the later processes, such as winnowing, husking and drying, are their concern. In Asia, paddy is the main crop (daddy is the term for rice until it has been processed) but other grains are also grown, such as wheat and millets as well as legumes.

When the threshing has been completed the straw and the grain are separated by means of a riddle, and the grain is then heaped in a corner of the compound; and covered over. The woman's next task will be to dry this and, on a suitable day, she will therefore spread it out in the sun, turning it over several times with her foot. All the time she must be on the watch for sudden showers and to drive the birds and poultry away.

Next comes the winnowing, which she will perform by placing some of the paddy on a flat circular tray made of split bamboo. She will then hold this above her head in the windiest corner of the compound that she can find and toss the paddy up into the wind. This will blow away the lighter grains which lack a kernel, but allow the heavier ones to fall in a pile at her feet. Sieves will then be used to clean the grain still further and this same process will be repeated again after husking and after milling.

After this has been satisfactorily completed the grain has to be stored away and the woman is responsible for seeing that this is done properly so that the grain does not spoil. Often she will put it into large earthenware pots or baskets, placing a



(9) Husking paddy with a dheki .

piece of matting on top of the grain before sealing the opening with a mixture of mud and fresh dung. Where there is a considerable quantity of grain a small storage hut will be built, usually of bamboo and mud or coiled grass and raised up from the ground on a platform, or on poles.

The paddy, however, is still not ready for consumption; in many, but not all areas, it now has to be parboiled and this is to be encouraged because, although it makes more work for the women, it improves the rice as a source of protein, reduces vitamin loss and makes the paddy easier to husk. To carry out this process the woman will first build a temporary stove of mud in a shady part of the compound, and, after she has collected enough fuel for this (which may be difficult because firewood is very scarce everywhere) she will place a little water in some pots on the stove and steam the paddy until it reaches the stage when the grain bursts open. It takes considerable skill to judge just how long the paddy needs to be steamed to achieve this. When this has been done successfully the pots are emptied and the parboiled rice spread out in the sun to dry once more and the whole process may need to be repeated, so that it may take several days to complete.

The next stage is husking, or hulling as it is sometimes also called. The main 'husking' is, always a big event in a family's life but it is a process which is often repeated so that the sound of paddy being husked can be heard somewhere in a village throughout the year. Most women reckon to have to do this at least twice a week. Two methods are usually employed, in the first, the women pounds the grain in a large wooden, or stone container by means of a heavy pole which she holds vertically and allows to drop on the grain. This is probably the most usual method and is the way pulses are also de-husked. In the second the women will use a dhecki — as it is called in Bangladesh — which is a heavy wooden beam, about six feet long and suspended horizontally on a fulcrum between two upright posts. The woman raises this beam by pressing down on one end with her foot and then releases the pressure so that the other end of the beam, which is tipped by a hard piece of wood at right angles to it, falls on to the grain placed in a container beneath it. Usually three women operate this 'dhecki, two taking it in turns to raise the beam with their feet and the third keeping the container full of grain. Working together in this way three women can husk slightly over one hundred pounds of paddy in a day but it is very hard work. There are three stages of husking, the first removes the outer skin, the second removes the next layer and the third leaves the rice ready for consumption. The discarded husks are used to feed the poultry and cows, the chaff for fuel, and the straw for rooking and such things as mats.

It will be seen from this outline that the rural woman in Asia has an extremely full working day, and that she plays a far more important part in post-harvest activities than she is always credited with, especially by Westerners who buy their food ready processed and packaged and do not always appreciate, therefore, the amount of work that goes into this still in the developing countries.

This has been a description of the life of a woman on the subcontinent of India but, basically, women throughout Asia will have much the same tasks. In parts of S.E. Asia, and West Asia, the women may work alongside the men in the fields and greater use may be made of draught animals. In other countries, such as Thailand, Korea, the Philippines, Taiwan and West Malaysia, rice may be grown on a large scale, for export, and the cultivation and processing will be carried out largely by machines, but this is commercial, not subsistence, farming.

Women are also employed as labourers, on a daily wage, in tea, coffee and rubber plantations in a number of Asian countries but they will usually live in labour lines and are therefore outside the scope of this book which is concerned only with daily life in a village.

(37) Pressing cane to extract sugar



CHAPTER 4

A day in the life of an African woman

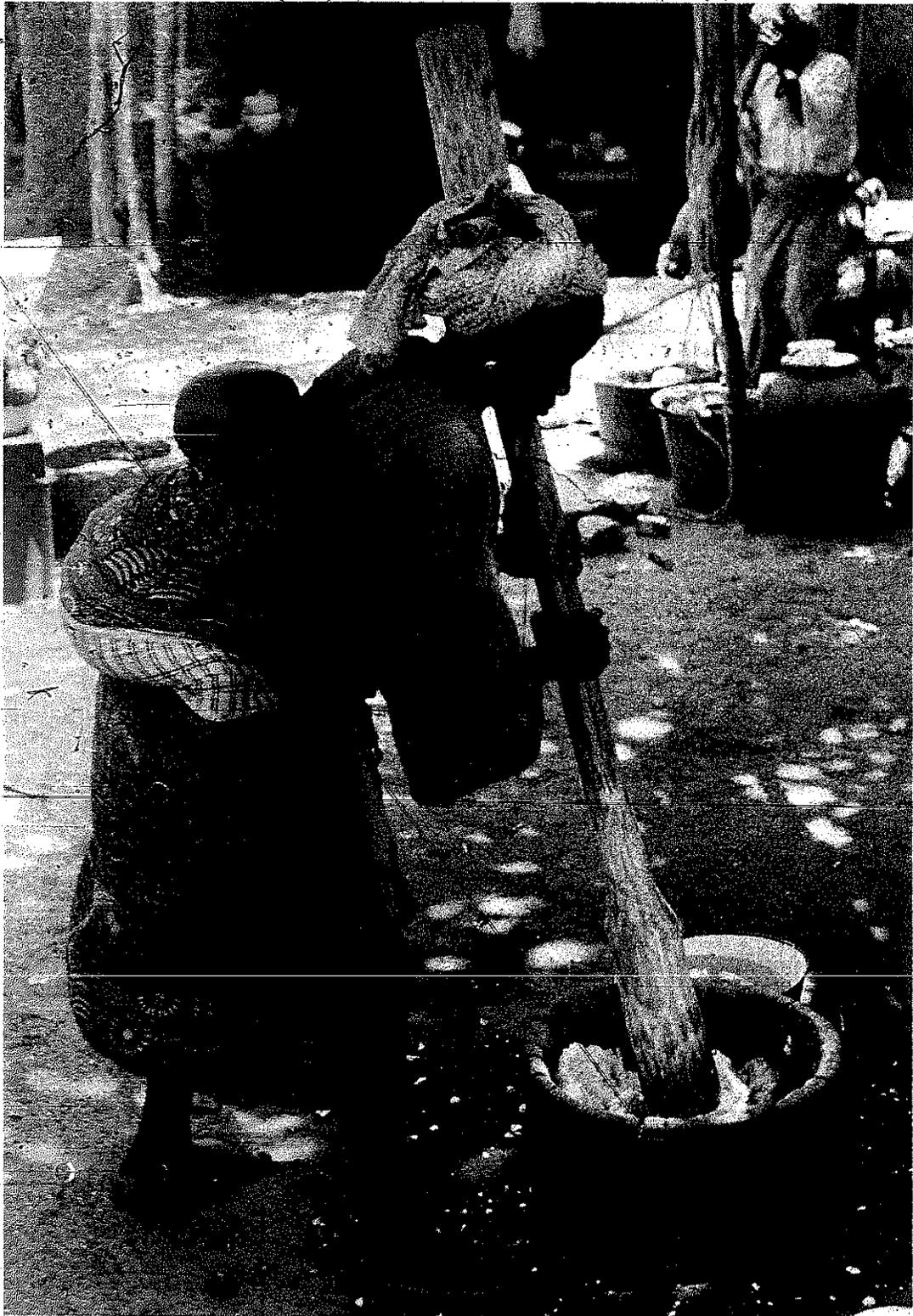
The work pattern in most of Africa is very similar to that already described for Asia, at any rate as far as the women are concerned and is therefore not repeated in its entirety here. The African women, too, will rise with the dawn and work as much as twelve hours a day and, although her housekeeping tasks may be a little less demanding, she may have to fetch water from a greater distance and, if she lives on the edge of the Sahara, she will have to battle constantly, against drought. Cyclones and earthquakes however, are less common than in Asia and the continent is not so densely populated so that there is less pressure on the land:

In general, the main difference between the African woman's way of life and that of the Asian's is that, in addition to the responsibility for processing the foodstuffs, which they share in common, the African woman will usually also have to grow them. This applies to the Asian women also, as regards fruit and vegetables, but the African woman's farm will be much larger in extent and she will grow a much greater variety of food crops: It is usually only in Islamic Africa that the man plays any significant part in subsistence farming; although cash crops, as has been said earlier, are another matter.

~~The African woman will therefore set off for her farm not long after sunrise,~~ taking her small children with her and will probably remain there until dusk. On her way back she will collect both wood and water, carrying them on her head or in a large basket on her back, and, when she reaches her homestead, although her domestic tasks may be a little less exacting than those of the Asian women, and her cooking simpler, she will nevertheless still have to process the food she has grown before it can be eaten. She is usually of a more robust physique than the Asian woman (although the latter's strength should not be under-estimated, the frailest of them will carry loads which would make a white man blanch) but, all the same, her life is a hard one, although she herself may not regard it as such since she has been used to no other.

Whilst it is obvious that she badly needs help to lighten her labours it would be a mistake to think that this can necessarily best be achieved by taking farming out of her hands altogether, since this would only worsen her position; not improve it. The fact that it is she who now provides the family with its food is the ultimate sanction that she has in any domestic dispute with her husband, if she refuses to work her farm the family will go hungry. She also takes a great pride in her farming skill and enjoys considerable prestige in the community because of it, and she would lose this status if her husband were to take over from her.

* In most developing countries the family is all important but, in Africa, the tribe will come not very far behind this. A stranger passing through a village who may



(18) Pounding cassava in Nigeria

find himself in difficulties has very little prospect of help from anyone, but a fellow tribesman in similar circumstances must be treated almost as if he were one of the family. This means that it is perhaps easier to get the women of a tribe to work together on a project than it sometimes is in other continents so that, when one cannot work her farm for some good reason, such as pregnancy, the other women will do it for her. Conversely, however, it will be much more difficult to get the women to work with the members of another tribe.

The system of land tenure can vary greatly. Land may be vested in the extended family, the village community or the clan or tribe, but the large landowner, renting out his fields to tenant farmers, who is frequently to be found in Asia, is generally absent from Africa; although agrarian codes, influenced by Europeans, have been superimposed in some parts of East Africa, and farming is, on the whole, more mechanised there. In parts of West Africa, women farmers will customarily be regarded as owning their farms, and the crops on them, but not as owning the land itself. There is also much more land available for cultivation so that, in the Cameroons for example, once a woman has been allocated a plot she can hope to farm it for life and even to hand it down to her daughter. This farm, however, will not usually be greater than 1½ to 2 acres in size, unless there are other female members of the family, to help her, in which case it may be as large as five acres. It may also be broken up into several small plots. Whilst the women's life is a hard one it has been pointed out that it is in those primitive societies where women toil most that their status is most independent and their influence greatest. In devising schemes, therefore, to reduce their physical labour care needs to be taken that these do not unintentionally reduce their standing also.

An African woman brings considerable knowledge to her farming, acquired from her mother who will have obtained it from hers. She will know from experience which crops will grow on her land and which will not, and has frequently been proved right when the Agricultural Officer has thought otherwise. She will mainly use a hoe to turn the soil, ploughs will be used only where draught animals are available to pull them, or tractors, and, in either case, this will usually then become men's work. It is men's work too, to look after the animals but women are increasingly taking this over, especially when the animals are kept in stalls. In a large part of Africa however, the Tsetse fly prevents people from keeping draught animals at all.

The crops that the woman plants will depend on where she is living. If she is up in the highlands she will be able to grow maize, millet, and sorghum, as well as carrots, Irish potatoes, cabbage, okra, egg plant and similar vegetables. If she is living in the forest areas, or in delta country, what she can grow will be more limited and may possibly be confined to root crops such as yams, cocoyams, cassava and sweet potatoes. Some of these may also be grown in the highlands but will not form the staple diet, as they do in the lowlands. Near the Sahara, mostly grains will be grown. As a consequence of their more varied diet the people's health in the highlands is usually better than in the lower lying regions, the people nearer the coast, however, have the advantage of a more plentiful supply of fish and palm oil. Legumes will also be grown and plantains; paw paw, bananas, avocado pears and mangoes grow freely but meat is a luxury. A little hill rice is planted in suitable areas but wet paddy is usually only grown on a commercial scale. Ground nuts, castor seed and bananas in any quantity, as well as cocoa, tea, coffee etc., are cash crops and therefore the concern of the men.

People who advocate that it is 'time that the men should take over the



(11) Grinding maize between two stones to make flour

(12) Milking in North Senegal



subsistence farming from the women sometimes overlook two points. The first is that the men show little inclination to do this; the second, that the agricultural role is, in any case, forced on the women, as well as the care of the elderly and the disabled, in those countries where the men are away for years at a time, working on the large plantations or in the mines. If she were not to undertake this task she and her children would starve.

As in Asia, food processing is entirely in the hands of the women, as far as subsistence crops are concerned, and grinding maize or millet between two stones, to make flour for a type of porridge which is eaten in many parts of Africa, is extremely hard work. Then cassava needs to be soaked repeatedly if it is not to be poisonous, yams grated, and palm nuts crushed for oil. With the primitive tools now available this is a lengthy and back breaking task.

The grain must also be threshed, winnowed and husked in much the same way as has been described in the preceding chapter, although, in the Sahelian region drying and storing it is less of a problem than in the more humid parts of Asia. The parboiling of rice is not usually practised.

Although the woman grows her foodstuffs primarily for the consumption of her family, she is permitted to sell any surplus in the local market and this money is regarded as hers, to spend as she wishes.

The women will usually cook their food in large iron pots suspended from a tripod over a fire or else placed above it on a trivet, or three stones. In the highlands, where it can be cold at night time, the cooking fire is often inside the hut, so that the smoke must filter out through the grass roof. This has the advantage of smoking the grain stored under it, and so helping to preserve this from insects but is also responsible for much eye and lung disease. Children and old people, also, sometimes roll over into the fire when they are asleep so that they are burned.

Like the Asian woman, the African woman will make mats and baskets during the rainy season, for her own use and for sale, she may also make clay pots; for cooking purposes, and it is usually she who makes the sun dried, mud bricks for housebuilding.



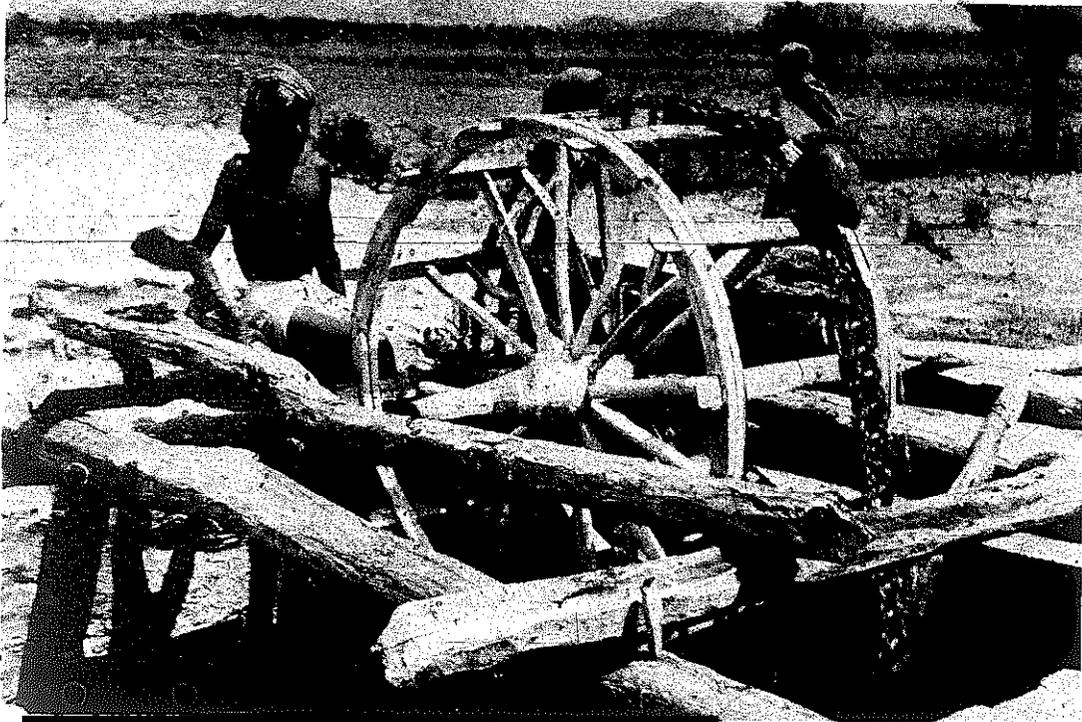
(13) Preparing a meal for school children in Botswana

CHAPTER 5

Intermediate Technology – what is it?

The addition of ball bearings to a potter's wheel will increase his output threefold, at very little extra expense, because the wheel will turn more swiftly and more smoothly, as will a cycle rickshaw if gears are added to the wheel hub. Trees, which are at present cut down by hand, can be felled more quickly and much less laboriously, by means of a chain saw, and at much less cost than with a bulldozer. All these are examples of Intermediate Technology, that is to say they are improvements on existing technologies but are not too costly or too sophisticated for the user to be able to pay for them, nor do they destroy the existing way of life as more advanced technologies sometimes do. Very often in a development programme now, lorries are introduced when hand carts would have sufficed and engine turned mills when hand operated ones would have been more suitable; tractors are encouraged instead of draught animals and little attention is paid to the unemployment which usually follows the introduction of machines to carry out processes now being done by hand. This is especially true where women are concerned, the introduction of such machinery very often takes away their livelihood because engines are considered to be men's business in most societies.

The man who can be said to have played the leading role in shaping the philosophy of the Intermediate Technology movement – for such it has now become – is Dr. E.F. Schumacher, the distinguished economist and author of "Small is Beautiful", who died in 1977. In this book, which has become a world best seller and exerted a great deal of influence everywhere, he argues that man's current pursuit of profit and progress, and the fragmentation of expertise which has led to scientists, economists and technologists all working independently from each other, has also led to economic inefficiency, environmental pollution and inhumane working conditions. He points out that, when an advanced technology is introduced, the simpler, or as he termed it the "Intermediate" technology dies out, so that a farmer who cannot afford, or does not want, a tractor is eventually forced out of business because he can no longer obtain the draught animals to pull his plough – or even the plough itself. And, as most of us know to our cost, this process is continuing all the time. Manufacturers now deliberately build in obsolescence and, although the 1977 power failure in New York should have warned us all of the dangers of being too dependent on one form of energy, it is becoming increasingly difficult to buy anything which is still operated by hand. Non electric typewriters are reported to be no longer manufactured in the United States of America, whilst kerosene operated refrigerators and fans disappeared some years ago, although the former could still be of use in rural hospitals and clinics which cannot hold stocks of certain drugs now because they do not have electricity for refrigerators. In the same way, now that people in the developed countries are mostly



(14) Man raising water by means of a Persian wheel

(15) The woman does the manual work whilst the man rides the tractor.



deep freezing their surplus fruit and vegetables it is becoming increasingly difficult to obtain Kilner or Mason jars to bottle them. As these things are phased out, however, life becomes just that much more difficult for people living in rural areas, who may not, in any case, be able to afford electricity even when it becomes available to them.

It is for these reasons that Intermediate Technologists, in addition to attempting to evolve improved technologies from existing ones, or to carry out research to develop new ones, are also seeking to revive some of those which were too lightly discarded with the invention of the steam engine. Wind and water were used as sources of energy for many centuries and they could be employed again to pump water for irrigation purposes, or to generate electricity or turn machinery, whilst much of the manually operated agricultural equipment in use on Western farms until the end of the last century could still be of use in the developing countries today. Hand tools, in particular, had been refined down to a state of near perfection by then and the introduction of these designs could save much unnecessary fatigue on the part of the women now due to the poor cutting edges and badly balanced handles of their existing tools. Anyone who has tried to fell a tree with a local axe fitted with an improvised handle and has then been able to switch to one with a scientifically curved handle designed to achieve the maximum impact with the minimum of effort will appreciate the truth of this. It may well be too costly and, also, possibly not entirely desirable, to import these tools from the West but it should be possible to teach the village blacksmith how to achieve a better tempering of their blades and how to make a smoother and better balanced handle, the tools in use at present are often well thought out for their purpose; it is the quality which is poor.

When introducing new technologies, however, it is most important that great care is taken to ascertain beforehand that these will not conflict with local customs or they may do more harm than good. It is true that, if time is no object, customs can eventually be changed but it is questionable whether this is always desirable and it will certainly be far quicker and easier to adapt the technology to the women rather than the women to the technology. Machines, after all, should be made for the people, and technologies are more easily introduced when they are at least familiar to the intended users although, even then allowance must still be made for the time that it may take to become accustomed to using them. A mill which requires a rotary action to turn it will be resisted at first by the women if they are more used to a backwards and forwards or up and down motion. They are far more likely, to complain initially that it makes their arms ache than appreciate its advantages but they will gradually come to see that it is saving them many hours of work; and will then be extremely thankful for it,

But, as has been said before but cannot be said too often, once engines of any kind are introduced they become men's business. The invention of the potter's wheel, many centuries ago now, led to the men taking over this trade from the women and this pattern has continued down through the ages so that where women still make clay pots they are usually expected to use the coil method and leave the wheel to the men. When technologies conflict with the locally accepted conventions also, the women may fear to use them, so that something like a pedal operated grinding mill will be of little help to them if customs dictates, in that country, that women do not sit astride.

Dr. Schumacher founded the Intermediate Technology Development Group, in London, as far back as 1965, and it is still one of the leaders in the field. The main aims of this Group are to gather and send out information on low cost, self help

technologies” and to test these, out, where necessary in the developing countries themselves. It also carries out research and development into more appropriate processes where there is a gap in the existing technologies and it is advised by a number of Panels which bring together a wide range of people with a high level of professional expertise. It publishes a quarterly journal “Appropriate Technology” as well as a number of publications on related subjects and it has two other subsidiary companies. Intermediate Technology Services Ltd, and Development Techniques Ltd and is in the process of setting up an Industrial Services Unit. In recent years a number of other European countries have formed similar organisations. The National Centre for Appropriate Technology has also been set up by the United States Government, in Montana, to encourage Americans to adopt simpler and more, energy saving technologies in the United States itself and that Transational Network for Appropriate/Alternative Technologies was formed after the 1976 Habitat Conference to act as a co-ordinating and information body. There are also a number of groups now in the developing countries, notably in India, and some Colleges of Technology have similar bodies. A list of all these organisations is at the back of this book. The movement is therefore having an increasing impact on rural development programmes, although there is perhaps a need to see that it does not sometimes lapse into technology for technology’s sake or become too radical in outlook. The philosophy is as important as the technology, it can, in fact, claim to be a way of life in itself.

The use of the word “Appropriate” instead of “Intermediate” also seems to be gaining ground and causes some confusion on occasion; there are probably more Appropriate technology groups now than Intermediate ones but they all have the same object, it is really only a matter of semantics. If one is splitting hairs however, it might be claimed that Intermediate Technology, by virtue of its aims, must always be appropriate whereas Appropriate Technology is, not always intermediate, some projects, so labelled, may be extremely sophisticated.

Objections have been raised in the past to the effect that to offer the developing countries technologies which the West has discarded in some cases, is to offer them the second best but these are not often heard now-a-days. With the advantage of hindsight, the leaders of these countries have come to see that they have the opportunity of avoiding the blind alley in which the West now finds itself, with its over dependence on fossil fuels and other natural resources which are rapidly running out or becoming too costly to use. As these prices continue to rise the cost of operating machinery of any kind becomes an important question. Tractors can be seen rusting in the fields today because the farmers can no longer afford the fuel to run them or obtain the foreign exchange to purchase spare parts. Unfortunately, if these farmers sold their draught animals to buy these machines, they are now worse off than formerly — since they cannot exchange their now useless tractors for bullocks and have no money left now to buy the latter. It might have been better, in the first place, to have improved the pulling power of their bullocks instead, by re-designing their harness and — this is certainly what Intermediate Technologists would have done.

CHAPTER 6

Ways in which Intermediate Technologies could help in Agricultural Programmes for the women

As has already been said in earlier chapters, the chief tasks which confront the women are mostly agricultural in nature. Subsistence farming is largely in their hands, especially in Africa, and so is the processing of the food grown for family consumption and also, in some cases that grown for sale in the local markets or for use as cattle feed. The Central Food Technology Research Institute, at Mysore, estimates that this represents 70% of all the grain grown in India. In some countries, too, the poorer women, without land of their own, may hire themselves out as farm labourers, or make a little money by processing the grain grown by the larger landowners, and many women and children will help in the fields at harvest time, as they used to in Europe before mechanisation.

Women's involvement in agriculture in the developing countries is therefore considerable and it is with these agricultural tasks that they are probably in most need of help – but not in the form of mechanised farming which will more probably worsen their lot than improve it. Most of their farms are too scattered and too small to make tractors a practicable proposition, even if they could afford them – which is unlikely in most cases – and, in all probability, their introduction would lead to the men taking over the farming. To some people this might seem desirable, in view of the women's very heavy work load at present, but, in fact, such a move would mean that the women would lose their present high status in the community – as controllers of the land – and end up doing the menial tasks for the men.

In any case, many agricultural experts now agree that tractors can sometimes do more harm than good in tropical conditions. Manshard points out, in "Tropical Agriculture", that it can be disastrous to use European criteria in attempting to decide what are the best farming methods for other countries – as the ground nut scheme in East Africa demonstrated only too well some years ago now. He claims that top soil and soil fertility itself are more easily destroyed in the tropics than elsewhere because organic matter decomposes faster at high temperatures, whilst violent rainstorms wash away much of what remains of the soil's properties. In these circumstances, he argues, the wrong use of tractors can make matters even worse since an essential requirement for their use is that the soil is reasonably dry. The tropics, however, do not have the frost which helps to ensure this in the temperate zone.



(16) Women harvesting paddy in Indonesia

But one of the greatest arguments against the indiscriminate use of the tractor is the economic one; quite simply, they cost too much to buy, to operate and to maintain. Rotary tillers may be a better proposition for subsistence farmers but they are still costly, and are rather heavy and clumsy to use, although, in the latter respect they are improving. All the same, they meet the requirements of the cash-crop male farmer rather better than they do those of the women subsistence farmers, for whom they are not, on the whole, to be recommended.

If there are, therefore, few machines suitable for the use of the women it follows that they will need to continue to work their farms largely with hand tools, as at present, but there is no need for these to remain the clumsy, heavy and often blunt instruments they are now. It is best that they are still made locally or the blacksmith will lose his living, but, as has been suggested already, he can be shown how to improve them.

The tool most used by the women everywhere, is the hoe, both the digging and the chopping hoe. The first is the more common because, as well as being used for tilling and clod breaking it can be used also for ridging, surface cultivation and weeding. It is, in other words, an excellent multi-purpose tool. The blade can be variously shaped for different uses but it is usually oblong or square, and has a hole in it for the insertion of the handle — which is set at an angle of between 80 and 90 degrees. There is very little wrong with this tool, except that the handle is often the wrong length and clumsily made. Spades may seem more efficient to us but these need the pressure from the weight, of a heavy boot to drive them into the ground and it should be remembered that most of the women farm barefoot. For them, therefore, the overhead downward sweep of the hoe is a much easier motion.

There is a need however, to think carefully before introducing any new type of implement. A well meant, but unfortunate attempt, to help the women in one Asian country by substituting scythes for the sickles they were accustomed to use, when harvesting the paddy, merely led to the men taking over from them, because the scythes proved too heavy for the women to swing, so that the latter lost their employment.

After the land has been tilled comes the sowing of the seed and it is extremely important that this is done correctly. When this is broadcast, as it sometimes is, the seed may be deposited at varying depths in the soil, leading to uneven germination, whilst this method is also wasteful of the seed. More often, the seeds are planted by hand, in rows to facilitate weeding; whilst paddy is usually first raised in special nursery plots, the seedlings then being transplanted in the main growing field. There are several simple and relatively inexpensive seed planters already available which could help to make this work easier and less a matter of chance and the simplest is in the form of a hand planter which has a small hopper fitted with a wedge like device which, when it is pressed into the soil and then pushed slightly forward, makes a hole and then releases the seed into this. It also ensures that the seed is planted at a uniform depth.

When it comes to harvesting the cereals they have grown the women will use either the sickle, already mentioned, or a machete. The former is curved to fit round the sheaves, the latter is a long straight, general purposes knife. This method of harvesting by hand is slow but prevents the ears from shattering, which is especially important in the case of paddy, because of its soft, but tough, straw. Very few women, however, seem to know how to keep these tools sharp by honing them and, if they



(17) Women hoeing in Malawi, note the crude and heavy handle

(18) Women carry the heavy loads in most developing countries



could be taught how to use a whetstone from time to time when working out in the field, this would also help to make t&r work lighter.

Once the harvest is ready it has to be transported to their homes; all too often on their heads or backs so that, where the nature of the terrain is suitable, (that is to say reasonably flat) two wheeled push carts could be of great help to them. It is important though, that such carts are not too robustly constructed, or they will almost certainly be over loaded, and the women may find that they have exchanged a head load of 60 pounds for a cartload of several hundred weight. For this same reason the carts should not be too capacious either and they should be fitted with brakes. Where paths are too narrow to make such carts practicable a Chinese wheelbarrow might be substituted. These have only one large wheel, some 3 feet in diameter, and loads of equal weight are balanced on the racks on either side of this, so that the wheel takes the weight and not the arms, as in our more familiar Western type. The Chinese version is usually drawn by two people, one pulling and one pushing.

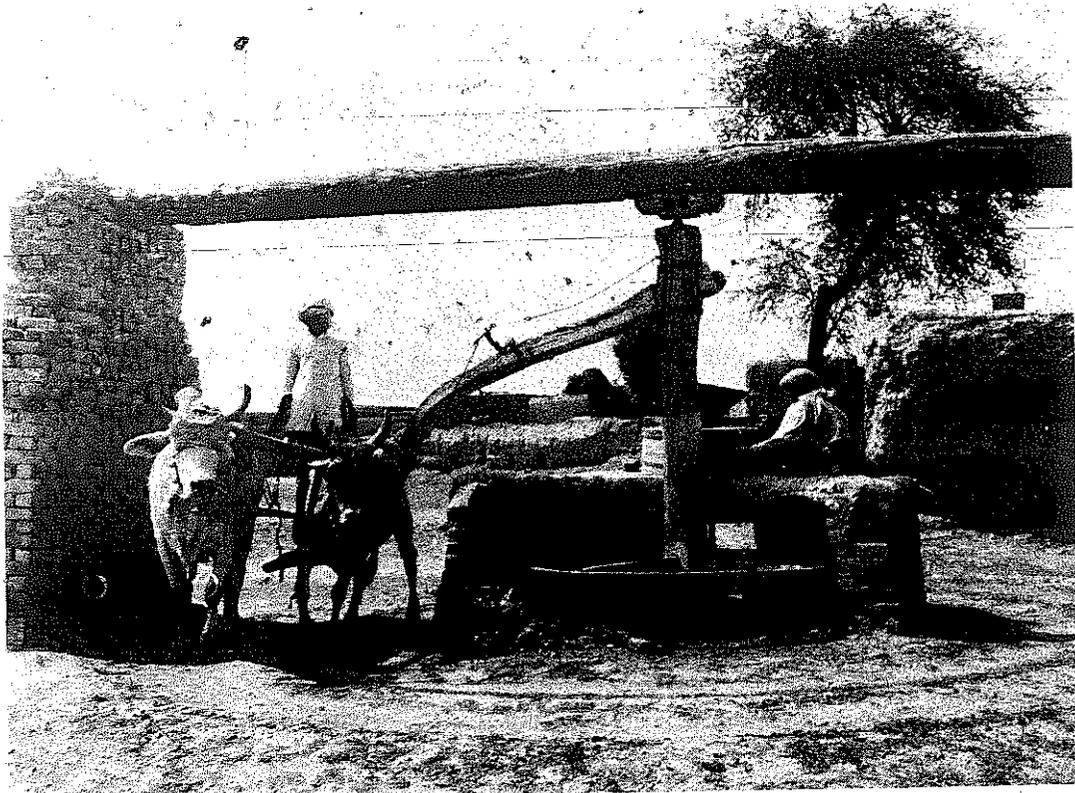
On treeless gradients, or where the ground is very muddy, loads can be transported on a wooden sled and, in countries where the mountains are interspersed with steep valleys, such as the Himalayan foothills, simple rope lifts can be installed similar to those used in Switzerland and Austria to send milk and hay down from the high Alps to the farms in the valleys. In its simplest form this merely consists of a rope stretched right down the mountainside, down which the container slides on a pulley, the rate of descent being controlled by another rope attached to it and held by the farmer.

Water is often needed for irrigation purposes and, here again, a great deal will depend on the country concerned, in very dry regions such as the Sahel, it will be a matter for experts but, elsewhere, the problems may not be so great. In hilly country, if there is a small stream on the hill it can be led down to the farms by means of a ditch dug along the contours. If it is necessary to raise it from a river there is the age old device of the Shaduf, which is basically a long pole with the water container on one end and a weight counterbalancing this on the other so that the physical effort of drawing the water up is reduced. A water wheel made of wood, or even bamboo, can also do this, lifting the water into irrigation channels running through the farms and the same applies to mills turned by the wind, of which the most inexpensive type is what is known as the Cretan mill, after the island of Crete, where many of these windmills are to be seen in operation. This has sails made of cloth instead of the more costly metal or wooden ones. Various types of hand or foot operated pumps can also be used to lift the water the few feet that is usually necessary, the International Rice Research Institute in the Philippines for example has developed a very simple diaphragm pump for this purpose. Many of these pumps are listed in "Tools for Agriculture" and books on the subject of water for irrigation purposes are listed in the appendix at the end of this book.

Finally, in many parts of Africa a man's wealth is shown by the number of cattle that he owns and, when they are allowed to wander freely, these often do a great deal of damage to the women's farms. In Asia they are more often herded. These cattle owners are usually the most important men in the village and are not always disposed to pay much attention to complaints from the women, who, consequently may have to sit up all night to protect their crops at harvest time. A programme to plant some sort of spiky plant such as sisal as a protective hedge, or, where this is not likely to grow, barbed wire fencing would make the women's life a lot easier. So too,

would the provision of bird scarers, either the type that makes a loud bang every few minutes automatically or else those which are made of some glittering metallic substance which flutters in the breeze.

(38) Traditional wheat mill in the Punjab



CHAPTER 7

Food and processing and Intermediate Technologies

It is probably, with food processing however that Intermediate Technologies can be of the greatest help to the women since there are a number of relatively inexpensive, manually operated machines already being manufactured which could do much to take away some of the back breaking nature of this work, without actually taking it out of the hands of the women.

There are, for example, several different makes of threshing machines, available, as well as winnowers, and the latter, would relieve the necessity now of waiting for a suitable wind to carry out this process. The threshing machines referred to mostly consist of a pedal operated, revolving drum against which the sheaves are held, so that metal hoops on the drum strip the grain from the stems. This is far less tedious than beating the sheaves against a wall, or on the ground or with a flail, and the machine is light enough to make it possible for it to be carried out to the field. The winnowers are often pedal operated also but the cheapest, and probably therefore the best type for the women, consists simply of a foot or hand operated fan, which creates an artificial breeze, thus enabling the woman to carry out this work when it is most convenient to them.

Paddy husking, however, is perhaps the most arduous and time consuming task that the women have to face now, especially in Asia, so that they are increasingly rebelling against this and are carrying their paddy instead to commercially operated mills and paying to have it husked for them. But, unless these are using rubber rollers; which is not usually the case, these mills remove too much of the vitamin content from the paddy, whilst the millers generally retain the bran for their own use, so that this is no longer available to the women. In some countries, such as Thailand, the women are aware of the value of this bran and retain it to make a type of soup from it but, elsewhere, malnutrition is on the increase due to vitamin, B deficiency and the miller's chickens grow fat at the expense of the health, of the people. Polished rice may not be too harmful in countries where other foods are eaten to supplement it but where it is the staple and sometimes only food, rice so treated can be disastrous.

It is not always realised either, that these engine turned mills waste much more of the paddy than the women do with their slower but gentler methods. In Bangladesh it has been estimated that the women, processing the rice by hand, can obtain as many as 30 seers from a maund of paddy, whereas the engine turned mills achieve only between 20 and 22 seers. A seer is a little over 2 pounds and a maund equals 86 pounds so it will be seen that this is quite a serious difference. Far less rice, too, is broken when it is processed by hand.



(19) Womens Institute Members in Sarawak. The paddy husking machines is on the right and they are looking at another machine to separate paddy

(20) A Corn Mill in use in the Cameroons



In such circumstances an efficient, hand operated husking machine is perhaps the greatest need in rural Asia today and it is to be hoped that it will not be long before a satisfactory one is produced. One is already manufactured in Japan (and was used in Sarawak by the members of the Women's Institutes there) but it proved too heavy for the women to operate successfully. It husks the paddy by hurling it against a rubber fly wheel which revolves at high speed as a result of two people pulling and pushing the operating handle backwards and forwards. It is an interesting and promising design but it is, hard work, for women at any rate, to get the fly wheel up to the necessary revolutions to make it effective. No doubt this problem will be overcome in time, — better gearing may be the answer.

In many parts of Africa maize is the staple food. The grain has first to be stripped from the cob, and a number of simple devices exist to do this, the simplest being a block of wood with four holes drilled in it into which the cob is inserted and, twisted. The maize is then often ground into flour, either by pounding it in a pestle and mortar or by rubbing it between two stones. This is another time consuming and monotonous task which has to be carried out after a hard day's work on the farm and one which can take as much as two hours to perform. There is an excellent cast iron, hand operated grinding mill however, which can grind as much corn in twenty minutes as the woman can do unaided in a week. It stands about four feet high but can be unbolted to make it possible to head load to villages away from a motor road and it can also be used to grind wheat, millet and coffee. A description is given in chapter 12 of the difference this mill made to the lives of the women in the Cameroons.

There are other types of machines available for other processes such as de-corticating groundnuts or cracking palm nuts to obtain oil from them — this latter is an especially heavy task for the women. There are also graters for cassava and yams, and hand operated rollers, looking rather like an old fashioned wringer, for crushing sugar cane. Again, particulars of many of these machines are given in "Tools for Agriculture," a buyer's guide to low & agricultural implements published by the Intermediate Technology Development Group, in London, and there is also a list of manufacturers, with their addresses, at the end of this book.

It is not suggested that many of the women could afford to own one of these machines for their own exclusive use but that the women should be encouraged to join together to own one collectively. Ways of doing this are suggested in Chapter 11."

Other problems with which the women have to contend are the drying of the grain to prevent it going mouldy and its storage. Experts put the losses now from rodents, insects and mould as high as 50% in some areas and there is obviously little point in a programme to increase cereal production if so much of it is going to be lost afterwards through faulty storage methods.

But before the grain is stored it has to be dried and, in the more humid and low lying countries, this presents a problem, sometimes the roadway is the only flat, dry surface available. Not only is this dangerous but much of the grain is scattered or, crushed by passing vehicles so that heavy gauge black polyethylene sheeting can be, of great help to the women, who can spread it on the ground in their compounds, underneath the grain, and also use it to cover this in the event of a sudden shower. Since black attracts the sun the grain will dry more quickly and more thoroughly by these means so that there is also less risk of mould forming.

When it comes to the actual storage of the grain, silos of metal or ferro cement would, of course, be the best but these are usually too costly for most

individuals to be able to' &template and, whilst one large one for the whole village might seem to be the answer to this problem: in practice it has usually been found that the farmers are reluctant to mix their grain with other people's. The best course therefore, is usually to try to improve the traditional storage structures instead. One way of doing this is to see that they are sited away from overhanging trees, which encourage birds and allow rats to jump on to the structure, whilst cone shaped metal guards placed round each pole supporting the floor will prevent the latter from climbing up these. The walls ought also to be plastered as smoothly as possible with mud, to prevent the rats from getting a foothold and insects from breeding in the cracks. The best way of achieving this is to adopt the Indian practice of mixing the mud with fresh cow dung or else to use crushed ant heaps, which will give a cement like surface. The structures should also be made as air tight as possible. the large hole at the top. through which the grain is put into the store should therefore be tightly sealed when this is full and the grain drawn out from a very much smaller hole at the base of the structure. This will help to keep the air out.

* Pesticides are not only expensive, carelessly used they can also be dangerous to the people's health. especially if the grain is not properly cleaned before it is consumed. It is best therefore, to encourage a natural means of controlling insect pests whenever possible. In some parts of India this is done by using a certain type of finely powdered clay mixed with the grain which seems to destroy insects by removing the fatty layer from their bodies so that they die of de-hydration. Activated charcoal can have the same effect and experiments have also been carried out in using powdered rice husks as a deterrent against the rice weevil. The Central Food Technology Research Institute in Mysore can give more information on this.

Whatever forms of technology are introduced into the women's programmes, however, it is essential that technologists, as well as the people in charge of rural development schemes, should work together as closely as possible. It is when this link has been lacking that programmes have failed, either because the technologies have been introduced by the rural development officer himself and have proved unsuitable because he has lacked the specialised knowledge necessary for this or because the technologist, lacking in his turn, the knowledge of the people and their way of life which the rural development officer has, has introduced technologies which have been undesirable socially. They need to work together as a team, and not in isolation.

CHAPTER 8

Intermediate technologies in the home

Few people in Britain under the age of perhaps fifty will have had any experience of rural life, as it is still lived in the developing countries today. We no longer draw our water from wells, or use oil lamps to light our houses, and wood or charcoal for cooking purposes. But this is still the norm in the rural areas of the developing countries. Most of us have forgotten, if we ever knew, that lemon and salt will polish brass, and wood ash or sand scour pots, quite as well as the proprietary brands we now feel are indispensable. We have also forgotten that food and milk can be kept cool through the principle of evaporation and that ice cut out of the livers in the winter can be stored underground for use in the summer. Our economy however, can perhaps bear the cost of manufacturing refrigerators and washing machines and of providing electricity to operate them but we are wrong if we think that these are the first essentials in a developing country; the provision of adequate supplies of clean water, the reduction of unnecessarily arduous labour, especially on the part of the women, and the introduction of schemes to improve their health and that of their families are far greater priorities — sick women bear sickly children.

Firewood is something with which the women have particular difficulty nearly everywhere and they may have to walk very far to find it. In the meantime they burn anything in sight and most of them suffer from cold at night in the rainy seasons, especially as they seldom have thick clothing to put on. Fuel plantations, therefore, could make life much easier for them. Self-regenerating trees such as Eucalyptus or the Giant Ipil Ipil tree (which flourishes in the Philippines) can be planted in such a way as to ensure a supply of firewood in perpetuity; once the trees have become established, that is, and providing that the women will be patient for the first few years.

The procedure is to plant say, one acre the first year, a second acre the next year and possibly three more acres in the next three years, — depending on the amount required. By the sixth year, and quite probably much sooner (because the rate of growth will vary with the country) the first acre planted will be ready for cutting down, and one more acre can be filled each succeeding year until the eleventh, by which time the trees on the first acre will again have grown up and be ready for cutting once more. A plantation of this kind is usually best planted by the people who are going to use it — then they will see for themselves that no unauthorised person fells the trees before they are ready, and providing that the rotation is strictly followed, this method should ensure that they have as much firewood as they need.

Biomass gas plants can also be a means of overcoming the fuel shortage and a great number of these are already in use in India through the work of the All India Khadi and Village Industries Commission; where they are known as Gobar Gas plants, Gobar

being the Hindi word for dung. At present, because of the scarcity of wood, most of the animal dung on the sub continent is burnt for fuel but if, instead, this dung is fed into an air tight tank (known as a digester or reactor tank), where it can ferment, methane gas is given off which can be piped into a nearby house for both cooking and lighting purposes, whilst the sludge left in the digester will be rich in phosphates, nitrogen and potash and can therefore be used for fertiliser. Sludge from a fish pond, old sewage, or the fermented manure from an old unit must be used as a starter and, after that, pig, poultry or cattle manure must be fed into the digester regularly -- a minimum of five cattle is required. After five to ten, days production will start but the gas produced at first will be poor in quality and should be discarded. After about three weeks, however, methane gas will be produced and can be piped to the place where it is to be used, which, in the case of a small domestic plant, should not be much more than 300 yards away. Large Bio Gas plants are possible; during World War II the sewage treatment plant at Dadar, Bombay was able to produce and utilise methane gas in a big way, but, unfortunately, one large one for the whole village has not usually proved successful because the richer farmers, with more animals and therefore more dung at their disposal, have felt that they were contributing more than the other farmers and have preferred to build their own plants instead. Everyone, too, was inclined to leave the feeding in of the dung to someone else (which is often the trouble with communal efforts) with the result that the digester q&often was allowed to go "off the boil". It is essential that it is fed regularly and it is the failure to do this, or an inability to get, fermentation started properly in the first place, which is usually the cause of failure in cases where these plants have not proved successful. The main

(21) Children searching for firewood in Anatolia

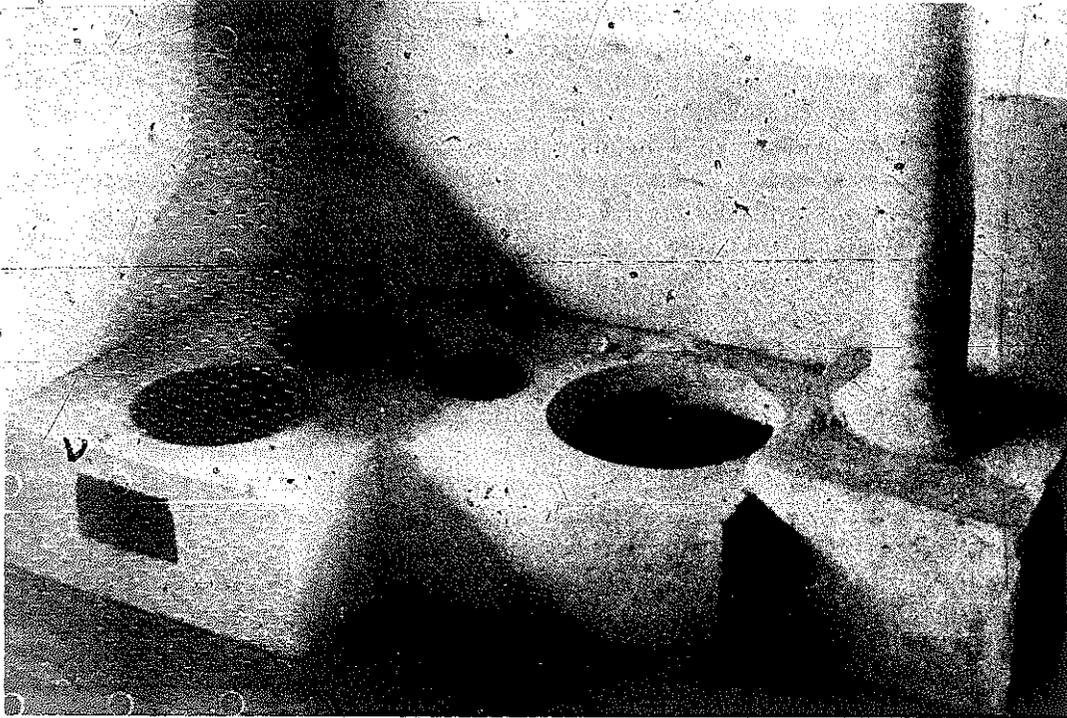


drawback at present however. is their cost, the ones built in India have cost from 1,500 to 5,000 rupees, depending on their size - but this is chiefly because the digester must be tight so that it is built of ferro cement at present: A number of people, however, are endeavouring to find cheaper alternatives, a College in India is testing a digester made from a bamboo frame covered with cement mortar and satisfactory results have also been obtained in the Philippines from one made out of an old 44 gallon oil drum, with the gas stored in the inner tube from a tractor tyre.

The possibility of using Solar Energy is also very much in people's minds these days, both on a highly sophisticated scale and at village level, but, in the latter case it cannot yet be said to be as satisfactory as Bio Gas promises to be. In most cases the apparatus has to be turned every few minutes to catch the sun and when mechanical devices are fitted to do this the cost is increased. Then there are, of course, such things as sunless days but the chief objection, as far as the women are concerned, is that they do the cooking usually in the early morning or late afternoon, when the sun is low. No doubt these difficulties will be overcome in time, a number of people are working on them, but, in the meantime, the most satisfactory use of solar energy is probably for drying surplus fruit and vegetables in order to preserve these. It is a comparatively simple matter to make a solar drier out of a large wooden box; painted black and lined with aluminium foil to catch the sun's rays, with racks inside on which to put the produce and a glass or translucent plastic lid on top. In appearance, in fact, the drier looks very much like a gardener's cold frame.

When it comes to the houses the people live in, most of these are very dark inside, partly to keep them cool but also for fear of intruders getting in through the windows; this could be prevented by fixing expanded metal mesh over these but in such a way that they can still be opened from the inside in case of an emergency. This would also help to let out the smoke from the cooking fires which, in the rainy season at any rate, are usually inside the house, and are the cause of much lung and eye trouble. The type of mud stove used in India and other parts of Asia forms the basis for an improved design thought out by the Hyderabad Engineering Research Laboratories some 30 years ago now, and shown in illustration 22. The important thing in the construction of this Herl stove, as it is called, is the flue or fire duct, which is L-shaped and designed to give the maximum draught. It should not be wider than 6-8 inches or higher than 4 inches, in order not to waste wood, and it should slope slightly upwards, towards the chimney. The holes in the top of the stove should be the same size as the base of the cooking pots, so as to keep the smoke in and, whilst it is best if the chimney is vertical, if the roof is of grass or matting this chimney must be bent at an angle of 90 degrees and passed through an opening in the wall behind to remove any risk of fire.

Now that more wheat is being grown the women are making more bread and a simple oven in which to bake this can be made from a 4 gallon kerosene tin. This is placed on its side and a door cut out of one side and hinged, it can then be placed on some bricks over a fire. A more substantial oven can be built by cutting a 44 gallon kerosene tin in half, adding four iron feet to lift it off the ground and using the bottom of the discarded half of the drum to make a tight fitting lid. A bigger oven, for making a number of loaves at a time, can be made by laying an entire 44 gallon drum on its side, supported on two or three rows of bricks, so that there is room to light a fire underneath it, and then covering the drum with earth, this will help to keep it hot. This, too, must have a door, or a lid, at the front end.



(22) A Heri cooking stove, made of mud

(23) Cooking on a mud stove in Egypt



The hay, or "hot", box, is another device which can save a great deal of fuel and which is very simple and inexpensive to make. A layer of straw or hay should be placed in the bottom of a wooden box or else a wide mouthed tin, both of which should possess close fitting lids. A cooking pot, also with a lid, is then placed on top of this layer of hay and more hay is packed tightly round it, so that, when the pot is lifted out, a hole will remain in the hay. The food to be cooked, either some type of stew or rice, is then put in the cooking pot and this is placed on the cooking stove and brought to the boil in the usual way. It is then taken off the stove and put into the hay box where the contents will continue to cook slowly for several more hours, providing that both the lid of the pot and the lid of the box have been closed, to keep the heat in.

It is also possible to keep food cool without the use of ice. In its simplest form the container need only be a large basket, with a close fitting lid; which is placed on some bricks standing in a large bowl of water, the basket should be just above nor in – the water. It should be covered as completely as possible with a large, wet cloth, the ends of which should be allowed to hang down into the water. As long as the water in the bowl is replenished from time to time the cloth will remain damp and will keep the contents of the basket cool. More expensively, a food cupboard, with wire mesh walls to allow the air to circulate, can also be treated in this way although it is advisable, in this case, to place a second bowl of water on top of the cupboard in which lampwicks, sewn on to the cloth, should be inserted. This will ensure that the cloth will be in contact with the water both at the top and the bottom and it will help to increase the coolness if the cupboard is placed somewhere where a current of air can blow round it.

Drinking water can be kept cool by the same method. It should be placed in a porous (i.e. unglazed) pot and hung out of the window in the strong sunshine, with the air circulating round it. The water inside, when required, will then be found to be much cooler than that kept in a dark corner in the kitchen.

The lack of an adequate supply of clean, drinkable water is responsible for many deaths in infancy now and should be one of the top priorities in a rural development programme. It is something, however which will need the concerted action of the whole village to remedy and is therefore dealt with in the next chapter.



(24) Stand pipes in a W. I. member village in Sarawak, fed by gravity feed from a nearby stream, and raised high enough to allow the children to bathe under them

(27) The only water available, for all purposes, for a village of some 200 persons, in the Cameroons



CHAPTER 9

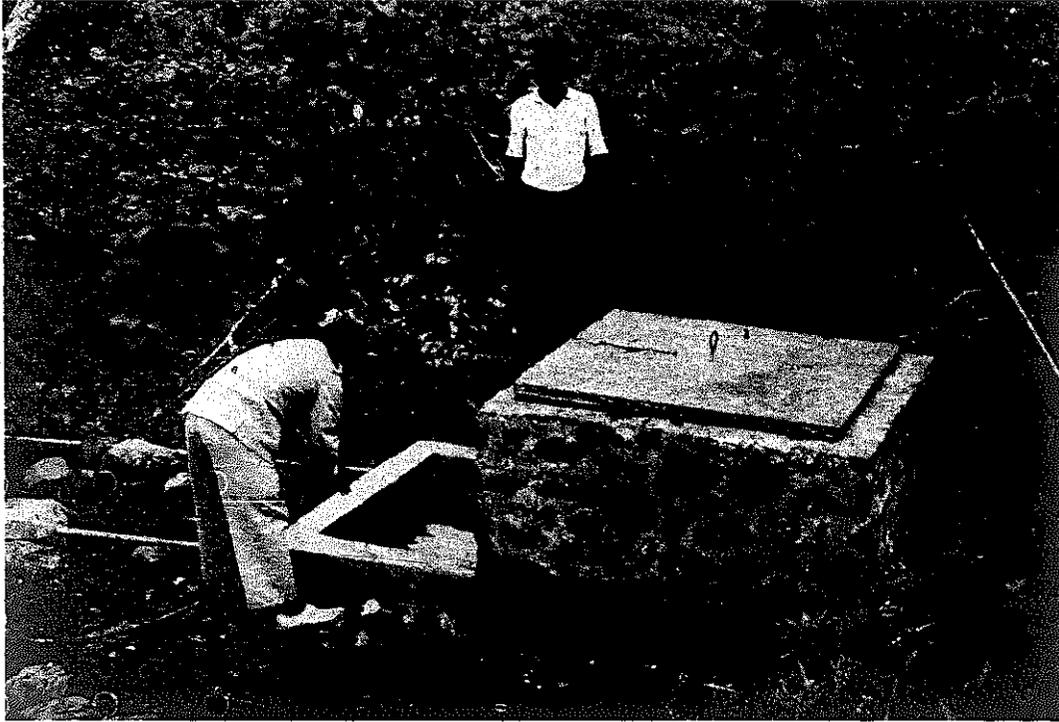
Intermediate Technologies in the village

Suggestions have already been made for providing water for irrigation purposes but there is an even greater need for adequate supplies of this for domestic use and the provision of these will not only relieve the women from the burden of carrying it but will ensure better health for everyone. Illustration number 27 shows a small muddy pool, fed from a spring, which was all the water available for a village of some 200 people in West Africa – for all purposes. Not only did they, and their animals drink this water, they bathed in it and also washed their clothes there. It is not surprising therefore that, in areas where such conditions prevail, disease is common.

Unfortunately irrigation schemes often seem to take priority over domestic ones – perhaps because few men carry water. There is also often a lack of co-ordination in water programmes, usually because the money for an irrigation scheme may come from an Agricultural fund whilst the domestic water supply will be the concern of a different Department. The result of this is that pumps installed to help the farmers irrigate their fields lie idle for quite a large part of the year, especially during the night, when they might also be used to pump water into storage tanks in the village.

There are other ways of supplying water however – at village level. In hilly country, a pipe can be inserted into a stream above the village and the water allowed to run down into the village through the force of gravity. Metal pipes have the disadvantage that they are both expensive and heavy and require a certain amount of skill to connect them and to bend them when necessary; but heavy gauge plastic piping is much easier to work with and where bamboo is plentiful this can also be used, especially as the villagers are very skilful at working with this material. If they have taken no initiative on their own account to carry out such a water scheme it is probably because they have not known at what point in the stream to insert the pipe, it is difficult in dense jungle to be certain how high one is above the village. Once it has reached the village, the water can be led directly into stand pipes, such as are shown in illustration number 24 or into a storage tank – the latter method is best but will cost more. If stand pipes only are used care needs to be taken that the water pressure is not too great for this, whilst, in the case of the tank, an overflow pipe will be necessary but, if this is placed high enough, it can make a useful shower for the children and even for the adults (picture 31). A wash house can also be built, near the tank, with sinks made of concrete and this will make clothes washing much less tiring for the women than when they must stand knee deep in the river (picture 30).

In cases where the water lies below the village, if this is not too far away, hand or foot pumps can be used to lift it and so, of course, can the windmills already



(28) *The spring feeding the water hole shown in the picture on page 40, was diverted into this small storage tank, thus providing clean drinking water*

referred in the chapter dealing with irrigation, but the best way of doing this is by means of a hydraulic ram — providing that there is some sort of waterfall, or this can be artificially created. These rams are self acting machines, operated by the force of the water itself, they will work with any fall from 18 inches to 100 feet and force the water to any height, from 15 feet above the ram to 1,000; they require no maintenance, and therefore, cost nothing to operate, all that they need is an occasional cleaning.

The ease with which wells can be dug depends upon the nature of the ground and the height of the water table below it. Where this is not far below the surface the people themselves have usually learned how to dig these but, where it is deep down, expert help will be required. In a number of countries now there are programmes to sink tube wells (and bamboo has been used successfully for this in both India and Bangladesh). Such wells can be costly if the water is far down but, where the water table is high, they can be very effective. Unfortunately, there is a tendency for the team of technicians to sink these wells and then move on elsewhere, leaving the people themselves, or a local contractor, to complete the surround, in brick, stone or concrete. The result is that this is often skimmed so that it soon cracks, the area becomes very muddy and the spilt water seeps back into the well and contaminates it. This could be prevented, however, if a drainage pipe were to be inserted into the surround to run the waste water off to a small tank a safe distance from the well. The animals can then drink from this whilst the well itself should have a small fence around it to keep them from contaminating the ground as well as churning it up with their hooves. It is also necessary for the team to see that someone in the village is shown

how to maintain the pump before they leave. otherwise it will soon be out of action.

Much of what has been said applies to hand dug wells also and, whenever possible these too, should be covered and the water raised by means of a hand pump. This ensures that it is not contaminated by people letting down dirty buckets or by children dropping refuse in. Where this is not practicable however, and the water has to be drawn up by means of a rope this should be attached to a windlass, as shown in picture 26. The effort required without this can clearly be seen in the faces of the women in picture number 25.

Where houses have roofs of corrugated iron or similar materials, or tiles, rainwater can be collected from these by putting guttering along the edge and running this into an old oil drum or a concrete water tank. In areas where malaria is prevalent however, it is important that the drum is screened with fine mesh wire to prevent mosquitos breeding in it. Rainwater catchment tanks can also be made by digging a large hole in the ground, with the sides sloping outwards, and lining these with polythene sheeting protected by tubular shaped plastic bags filled with a weak cement mixture and sealed at each end. These will consolidate under pressure from the stored water and make a firm wall. In both these cases the water may not be suitable for drinking but can be used for all other purposes.

Water can be filtered before drinking it by placing a layer of small clean stones, together with sand, in the bottom of a water jar and covering this with a layer of crushed charcoal. The jar should have a small hole bored in the bottom of it and should then be placed on top of another jar. After the water has been boiled it is then poured into the top jar from whence it drips into the bottom jar, after the sand and charcoal have removed the impurities.

Diet could be greatly improved in many areas by the development of fish ponds since they can provide an excellent, low cost source of high quality protein. The site needs to be selected with care however, any hole in the ground which has filled up with rainwater will not necessarily be suitable. It is best to choose a place where the pond can be constructed with the least amount of digging and where it can obtain, and also drain, water easily by the force of gravity. A fairly low lying piece of ground should therefore be chosen, preferably in a narrow, steep sided valley where a small earth dam can be built across a stream. If, however, the pond has to be dug, the walls should be about 6 feet high and sloping gently outwards and the aim should be for a depth of about 4 feet. It is best to have a deep and shallow end and, with a drain pipe, or sluice, at the deep end, which should be screened to prevent fish escaping from it. Before the water is let in, animal manure should be spread on the pond bottom and left for a week or two, and, once the water is in the pond, this should be allowed to become stagnant before the fish are added. It should become the colour of green pea soup, since it is on this plankton, that the fish will chiefly feed. Chinese farmers often build their poultry houses and pig styes out over the fish pond so that their droppings fall directly into the pond and also help to feed the fish.

It is, of course, necessary to select the right kind of fish for the local conditions, tilapia and the common carp are usually considered to be the best choice for tropical areas but the advice of the local fisheries officer should be sought and, in any case, his help will probably be needed to obtain the fish fry in the first place.

Electricity is probably one of the least of the needs in most villages but, where there is a small, fast running, mountain Stream, it should not be overlooked that



(25) Drawing water for cattle in Eastern Niger

(26) An improved well in Zambia, using a windlass to reduce the effort



this could probably power a small electric generator which might prove a cheaper form of lighting than kerosene, now that this has increased so much in price. The stream could also turn a water wheel and so operate machinery for some cottage industry or for grinding grain

In hot, dusty countries much eye and lung disease occurs now in the villages from the dust thrown up by passing vehicles in the dry season. This could be alleviated if the stretch of road running past the houses could be tarred whilst, at the same time, speed brakes could be built in to the surface at regular intervals to slow the traffic down and make life safer for the children.

Something which is very badly needed almost everywhere is a better knowledge of hygiene and a programme to build latrines should be encouraged wherever possible. although it will undoubtedly be an uphill task to get the people to use these. It is; however, a very necessary one because there is much ill health now due to worm infestation, especially where people walk barefoot.

The pit type of latrine, situated a reasonable distance from the house, is the most practicable and should not present great difficulties in rural areas, except where the ground is waterlogged. This consists of a manually dug pit, some 8 feet deep and about 1 yard square, and it should last for about a year, after which it should be filled in and a fresh pit dug nearby. Experts are divided however, as to whether the Chinese practice of using the contents as fertiliser should be encouraged, some say that this merely spreads disease. The pit can be covered with a wooden or concrete slab in which should be a lid, which should always be replaced in order to keep out flies. Other types of latrines, but ones which are more likely to require technical assistance to install them, are the water seal closet, with the closet East in concrete, and the aqua privy, which can be installed in, or near, a house (providing that it is kept clean) but will necessitate a system of sewage disposal at regular intervals. Mann & Williamson's manual on "Water Treatment of Sanitation" gives much helpful information on this.

When it comes to building houses the locally designed ones are usually far better adapted to the climate than the imported ones built of Western materials but the former could often be improved by the introduction of a damp course, when they are being erected. This can easily be made out of flattened kerosene tins — preferably coated with tar — which should be inserted between the bricks, some two feet from the ground, to stop the damp rising up into the wall. The tin should also project slightly from the wall, on either side, which will then help to prevent white ants getting into the house.

Roofs should have as much overhang as possible to prevent the rain striking directly on to the walls. If this is done sun dried bricks can last many years but bricks can be made also from a mixture of soil — preferably laterite — and cement, rammed down into moulds by a brick making machine. Walls can be made too, from "cob", which is a mixture of earth and water combined with chopped grass or sisal. In this case no poles or bamboos should be used in the wall, because they will swell in the damp and may cause it to crack, but the cob should be laid in layers, each about 9 inches thick and each layer be allowed to dry before the next one is laid on top. The grass will bind the mud and, when the walls are completed, they should be plastered with a mixture of mud and fresh cow dung.

It must be admitted that roofs of corrugated iron are less of a fire risk than grass and make it easier to harvest rainwater but they are very much hotter (unless a grass roof is laid on top of them) and will need a ceiling to make the interior cooler as

well as to shut out the sound of the rain.

These are all schemes which will involve the village as a whole; brick laying, for example, is usually men's work, although the women generally make the bricks, if they can be successfully carried out however, they will make a great deal of difference to the lives of the women.

(39) Woman weaver in Sarawak



CHAPTER 10

'Cottage Industries

Cottage industries, that is to say, light industries which can be carried out in the home, usually on a piece work basis, can afford a means for rural people to earn a living whilst remaining in their villages, but 'they need to be organised properly. In particular, whilst it is doubtful if the women already actively engaged in food production and processing could undertake anything more, a village based industry could be of the very greatest help to the poorer, landless women who desperately need work of any

k i n d .

The English woollen trade, which reached its peak between the 14th and 17th century was a good example of such an industry. Although carried out in the villages it was highly organised by the merchants and middlemen living in the towns, who kept the lines of production moving between the carders and spinners; the spinners and weavers and the weavers and fullers. Fulling was done in the fulling mills, which, from the 13th century onwards, employed water wheels to provide the power necessary to turn the fulling stocks but the rest of the work was done in the homes. Carding and spinning were usually done by the women and children whilst men undertook the weaving' — on hand looms. In this way 'the industry provided work for the whole family and the women especially benefitted from such a system since they could work at times most convenient to themselves and keep an eye on their children whilst doing so. The silk and cotton trades were organised on similar lines.

This situation changed however, with the invention of the power loom in the early 19th century. These new machines were too sophisticated and too costly to be used in the homes so that they were housed in purpose built factories in the towns to which the workers had to go if they wished to continue their employment and where they had to work for fixed hours each day and on a fixed wage; so that women with young children or elderly relatives to look after could no longer take part. The eventual result of these changes was that the younger and more enterprising villagers left the rural areas altogether and their prosperity declined as well as their population.

Something of the same situation is developing in the more advanced Asian countries today. There is a great need for income generating activities for both men and women in the villages there but, instead of taking the work to the women, some countries now bus these to their work and they have done this by establishing large industrial complexes in one central area, in which a number of light industries, often connected with electronics, are grouped together. It is true that, if the opposite policy had been adopted, and one or two of these industries had been established in each village instead, the workers would have had less choice of an occupation but this would have been a small price to pay to have avoided the disruption of family life

which has now taken place, in many villages only the very aged and the very young are to be found during the daytime, whilst the women themselves face journeys of as much as two hours each way every day or, if they are young and unmarried, live in hostels near the factories.

The establishment of cottage industries is a field in which Intermediate Technology could be particularly helpful since many of the more time consuming preparations which are necessary in the case of certain crafts, such as the splitting of bamboo, can be done much more quickly with specially designed hand tools, or small $\frac{1}{2}$ h.p. machines, of which Japan for instance makes a number.

It is useless however, to encourage the setting up of such home industries without also being prepared to set up a marketing organisation to sell the products the workers will manufacture. Tucked away in their villages they will have difficulty in selling these unless they are on a tourist route and, even then, they will need guidance as to the right prices to fix, as well as what is most likely to find a ready market. A relatively unsophisticated village woman who has, until now, been making mats and baskets in her own compound for her own use, does not always appreciate that, when she has received an order for three mats, size six feet by four feet, the buyer is not going to accept them if they measure two feet by three feet, or if the colour has been changed. Quality control is therefore essential, and, to ensure this, a full time organiser will be required, whilst others will be necessary to sell the products either to middlemen or else in shops belonging to the organisation in the towns.

As to what industries should be encouraged this is clearly dependent on what skills are available and what materials, since it is inadvisable to import these. In countries where the women are skilled needlewomen it will probably be best to set up some sort of handicrafts network based on traditional designs but possibly slightly adapted to overseas requirements. Tourists, for example, are not likely to be able to pack large quilted bedspreads in their air luggage but would buy the same quilting made up into something smaller, like a waistcoat. An eye needs to be kept on changes in fashion however, it is of no use to start an industry to make hat pins if people no longer wear hats, and sarongs, for example, are usually made in two yard lengths and saris in six, the one is too little and the other too much for most Western garments.

Rural women are expert at many other crafts besides weaving and sewing, in Bangladesh they work in jute fibre, with which they make things as diverse as carpets and plant hangers and in many countries they make often very beautiful baskets, trays and mats out of rice straw, reeds, split bamboo or palm leaves.

The bamboo and the coconut palm are two of the most versatile plants known to man. Bamboo is used for the framework of houses, for eating and cooking utensils, for articles of furniture, for piping, for fish traps, mats and baskets, it provides food, raw materials, shelter, and even medicine for the greater part of the world's population. It is flexible and after heating can be bent to take, and retain, a new shape. The coconut palm also has many uses, the flowers, the leaves and the nuts, between them provide, in varied form, food, drink, roofing materials and coir yarn, from which to make rope, string and matting. Coconut oil is extracted from the dried flesh, known as copra, and this can be used for a wide range of purposes, from cooking to making candles. The fibre is used for brooms, floor mats and fish nets and charcoal gas can be produced from the shells, whilst the waste products can be made into briquettes and burnt for fuel. Many cottage industries therefore, can be developed in countries where these two plants grow freely.

Blacksmithing, leather work and making articles out of brass are usually male occupations, although women may help with some of the processes associated with them. Pottery is often done on a family basis and the articles made are chiefly of a domestic nature, although dolls and small statues are sometimes also made for sale in the tourist shops.

Women can also be employed in hand printing textiles by means of wooden blocks but, in many countries, weaving on a broad loom has been man's work and the women have been expected to use the narrow loom only. This custom, however, is changing and women have, of course, always been associated with other processes such as spinning. All these are trades which can easily be carried out in the home; as tailoring can be also. Until recently tailors have mostly been men but, as they have turned to other work, women are learning this trade also and, whilst they may not be able to compete with the men when it comes to making such things as suits, they can usually earn a living making clothes for women and children. Very few people in the developing countries purchase ready made garments. There is scope also for the women to learn knitting by hand or on knitting machines, to make jerseys for export.

In fertile areas women can make a living by bottling, or drying in the sun, the surplus fruit and vegetables which so often are wasted now for lack of transport to take them to markets in the towns. They can also make chutney and acha and similar preserves, and, in coastal districts, dry and smoke fish. Because their hands are more delicate than men's they are also in demand for such things as jewellery making, especially filigree work and the electronics industry relies heavily upon them. This work unfortunately is usually carried out in factories but there seems no reason why the less complicated tasks could not be carried out in the homes on a piece work basis. Cigarette and cigar rolling are other tasks for women. Finally, there is a great need to help those engaged in food processing and production to sell their surplus produce, at present they usually have no means of transporting this to markets other than their local one. This is especially true in Africa, where the women are mostly so heavily engaged, in subsistence farming as to make it unlikely that they will have much opportunity to develop cottage industries on a large scale. In some parts of West Africa however, the women already play an important part in the textile trade and, of course, in Ghana and Nigeria, they are famous as market traders - with considerable turnovers.

India and the Philippines are two countries which are very well aware of the advantages to both the economy and the people of setting up Government supported organisations to sell cottage made goods abroad, as well as to tourists visiting their countries, and Malaysia and Thailand are two more countries which have done the same thing.

CHAPTER 11

How to set up an organisation for rural women

There is a saying that you can take a horse to water but you cannot make him drink. The same is true of a programme for rural women, you can devise this but you cannot necessarily get them to participate and, unless they do so, it will be a failure. It is not really possible to have instant development programmes, or, for that matter ready made ones. They need to be tailored to suit local requirements and will require careful cutting in the first place. If they are to fit properly, an organiser, preferably indigenous but possibly expatriate, will be the first essential – and one who is prepared for a long and difficult task. The programme will go much more smoothly however, if she begins by encouraging the women to set up some sort of organisation through which she can work. It is of little importance whether the individual groups, when formed, are called societies, or clubs, or institutes (although for the sake of convenience, the term "society" will be used in this chapter) what matters is that their establishment will afford her a nucleus of women, through whom she can reach the other women, and from whom she can gain an insight into the local problems, and customs.

Such an organisation can be started in two ways, in the first place by a Government Department decreeing that it should be done and seconding its personnel to carry this out; in the second, by beginning in a small way in one or two neighbouring villages and continuing by working outwards in ever widening circles, as the ripples in a pond do when a stone has been cast into it. The latter method is usually the best because the lines of communication are not extended too far at first, and the foundations can be firmly laid before the organisation is erected on them whereas the reverse is true of the other approach – the initiative will start at the top and have to work downwards, with the likelihood that it will have spent itself before it reaches the villages. In this case too, the leadership will almost certainly be drawn from the better educated women in the towns, who have very little in common with the rural women and are not always acceptable to them. Even if it is likely to have more secure financial backing therefore; such a way of setting up an organisation is unlikely to be as successful as a more flexible and less initially ambitious programme, commencing in the villages, will be.

The nature of the programme and its success, will, of course, depend very greatly on the personality and experience of the organiser who will be necessary to get it started. She must be someone who is prepared, and permitted, to wait until the seed she is planting has had time to germinate, to force, it too much at the start is usually disastrous, and she must be able to gain the friendship and confidence of the women

with whom she hopes to work in order to be able to assess the best ways of helping them. She will do best if, indeed, she lives in the village with them. She can be certain, however, that whatever programme she undertakes in the first village will be under keen scrutiny from the women in the neighbouring villages, so that (providing, of course, it has been successful) this will make her task much easier 'when she goes onto them. And, with each new village, the difficulties will decrease because, by this time, the women will be 'taking the initiative in approaching her, and will be eager to co-operate.

She would be wise however, not to overstretch herself at first but should confine her activities to villages within walking distance of each other, so that it is easy to establish a bond between them all. It is often a good idea to have some symbol of membership, such as an inexpensive badge, or-scarf," or bangle, to help to make the women realise that there are more societies than just their own and so encourage pride in their collective membership and give them a feeling of belonging.

As the societies spread it is advisable to link them up with each other by means of District, or Area, Committees, to which each society in the District can send an agreed number of representatives. This will widen their horizons and, at the same time, give them an opportunity to discuss their mutual problems whilst the local Authorities are more likely to listen to this collective voice, in matters concerning the women, than they might be to individual societies.

In time, when a number of these District Committees have been formed, these can be linked with a Regional Committee and eventually these latter Committees can be represented on a National Committee, which would then be responsible for the overall national policy of the movement. This will, however, have developed from the bottom upwards and not have been imposed from the top downwards and is therefore much more likely to succeed.

If the women are to be attracted in the first place, it is important that membership should carry, and should be seen to carry, some immediate practical advantage. This might, for example, be the opportunity to set up some form of cottage industry, which will help them to make money, or it might be the chance to purchase something collectively which, individually, they could not afford, or to carry out a project to improve conditions in their village. But the women will almost certainly be far too busy to be interested in anything which has a purely social purpose or, for that matter, even an educational one, badly though they may need instruction in such things as child care. These are best left therefore until later when the first measures suggested will have given them more leisure, and also have gained their confidence.

Membership should be open to all women, regardless of race or religion and it is wise to give politics as wide a berth as possible since party political membership will seldom be in the best interests of the women.

From the start the organiser should be careful to see that the chief men in the village, and the religious leaders, are aware of what she is attempting to do, and why, or they may try to hinder her and she will need to gain the support of the older and more influential women early on and try to persuade one of them to become the leader of the society. It will not matter if she is illiterate, because it is the secretary who should deal with any correspondence (which, in any case, at village level, this should be kept to a minimum) what will be important will be her influence over the other women and her ability to organise these when it comes to carrying out any projects. The choice of secretary may be more difficult but, since the organiser will

have to move on elsewhere when the societies are well established, it is an important one, as it will be through her that she will be able to maintain contact with the members. In areas where the majority of members are illiterate it is sometimes advisable to see if someone like the local school teacher or midwife will be prepared to act as a part time supervisor of meetings in return for a small honorarium and in this case she can advise the secretary.

Meetings, at first, should be informal and not too frequent; as the women become used to them their frequency can be increased and: in due course, an educational programme can be introduced, so that the women do not just sit and talk but also have a lesson on baby care or an agricultural demonstration. Usually medical and agricultural extension workers will be glad to know the dates of the monthly meetings so that they can meet the women all together, something which if is otherwise often difficult for them to do. The women should elect their own officers and the delegates to the District Committees, and the latter should elect those to the Regional Committees.

The ways of financing these activities will vary with the circumstances but, whilst they obviously cannot afford to pay the salary of the full time organiser or the district supervisor's honorarium, the women should be encouraged to be as self supporting as possible: they do not usually value something which has been given them for nothing but are proud of something to which they have contributed. They should, not, however, be expected to contribute a large sum at once but be given time in which to find the money and the very poor might be allowed to pay in kind, by producing, say, a couple of corn cobs instead of actual cash. If they are joining together with the object of purchasing, perhaps, a corn mill the cost of this should be divided equally amongst them all, and the more members there are the smaller this will be, but, even so, this should then again be divided into a regular monthly payment so that no actual hardship is incurred. This, of course, presupposes that the organiser has some capital at her disposal to pay for the mill in the first place but, if this takes the form of a revolving fund, she can do a great deal with very little. The next chapter describes the Corn Mill Societies in the Cameroons, where £200, treated in this way eventually financed the purchase of more than 300 mills at a total cost of more than £6,000. The mills cost £20 each, and as each society repaid its debt, the money was used to buy more mills.

As the movement develops more organisers will be necessary and, if the first organiser is an expatriate she will have been wise to have had her successor designate working with her from the start, so that the changeover will be as smooth as possible. Eventually, a national office, with attendant administrative and secretarial staff, will be required and travel will always be a heavy item of expenditure since it is essential that the organisers are out in the field as much as possible. Government Departments, however should find that the existence of the movement makes their task in the rural areas much easier and be prepared, therefore, to assist financially, but it is important to see that, if such grants are received, as few strings as possible are attached and that the societies retain their autonomy.

It is as a body of women able to achieve collectively what individually they would have been unable to accomplish that they will have their value and the next two chapters describe what two such organisations have been able to do in Africa and Asia to raise the standard of living in the rural areas.



(29) Corn Mill Society members learning to read and write
(40) Members digging a road to their meeting house



CHAPTER 1 2

Corn Mill Societies in the Cameroons

Although they have been described in greater detail elsewhere a brief account is given here of the development of the Women's Corn Mill Societies in the Cameroons because there are, as yet, very few written studies of rural women's groups in action and also because it was one of the first attempts to employ Intermediate Technologies as a means of gaining the confidence of the women.

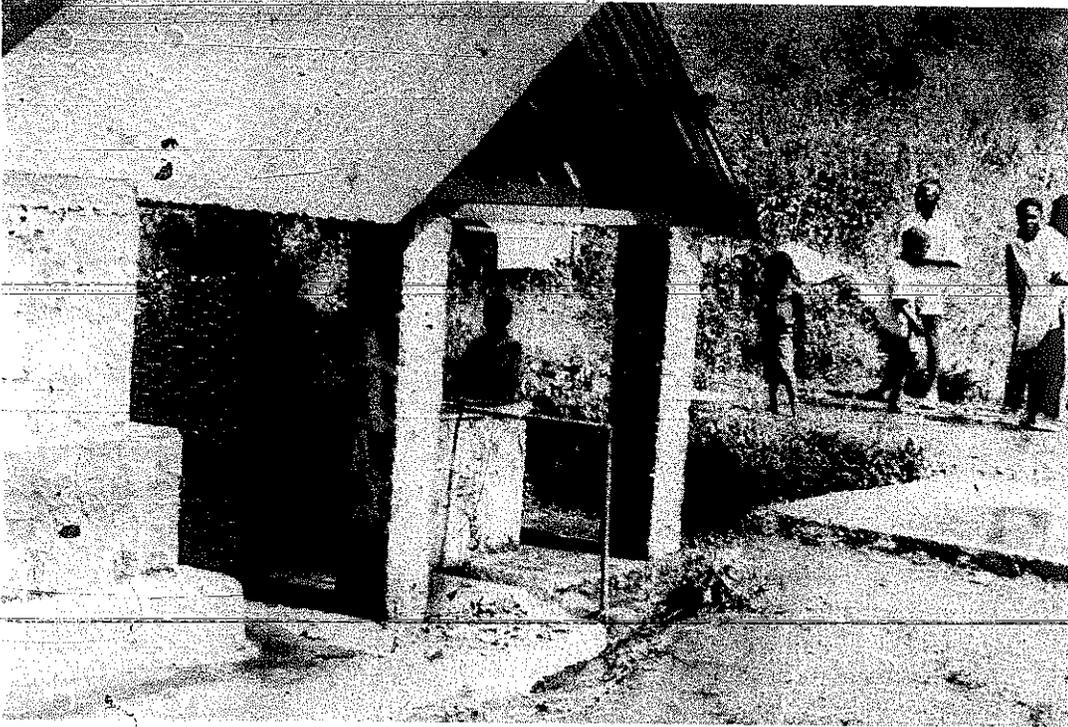
The programme commenced in the fifties when the Southern Cameroons, as it was then called, was administered under U.N. Trusteeship. It is now part of the Republic of Cameroun, in West Africa.

The Bamenda area, where the activities described took place, is high plateau country, some 4,000 feet up and ringed by mountains reaching a height of up to nine thousand feet. It is some 300 miles from the coast, from which it was often cut off in the rainy season when the roads were impassable. Much time and effort was expended by the women in grinding maize corn between two stones to obtain flour from which they made a type of porridge known, locally, as foo foo. This was the principal item of diet there, as it is also in other parts of Africa where maize is grown.

In an attempt to lighten this daily labour the women in ten neighbouring villages were therefore encouraged to form themselves into Societies with the object of each owning a hand operated grinding mill and ten of these were purchased with an initial grant of £200, the women undertaking to repay the £20 each mill cost within two years. It is much to their credit that, over a period of eight years, there were no bad debts. In order to obtain this money the women, who were all farmers, put more land under cultivation and farmed this collectively as the Society's farm. In other cases they raised the money by selling baskets, or pots that they had made.

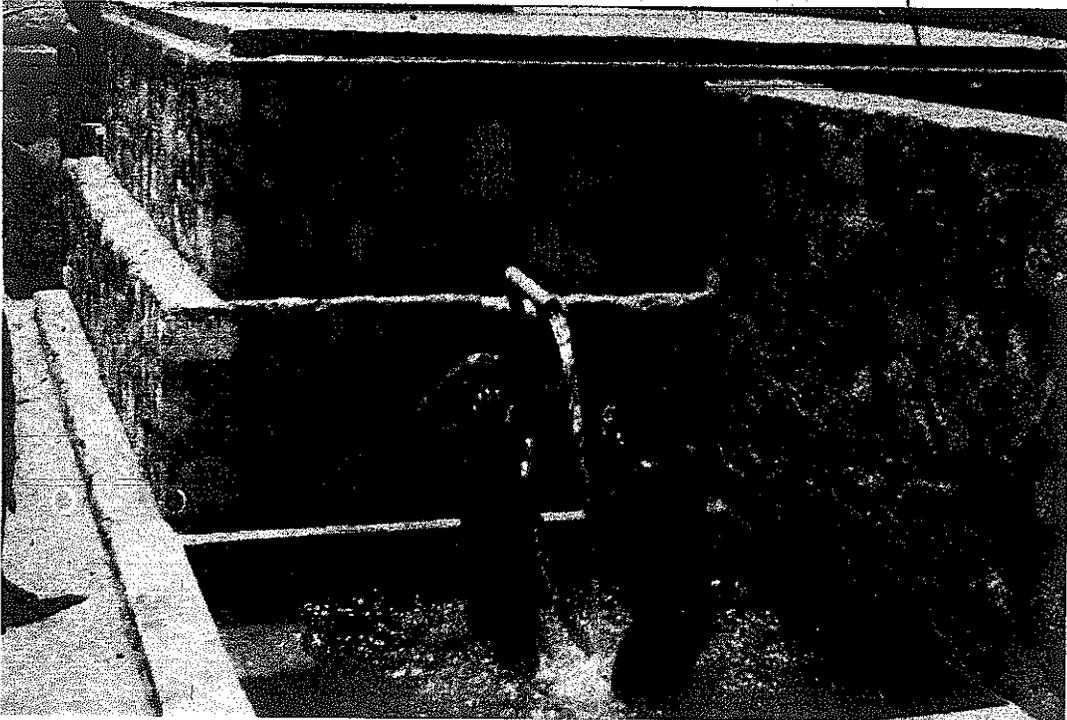
Membership, of the Corn Mill Societies, for so they came to be called, was limited to a maximum of one hundred women in each Society. when it became clear that, if this number was exceeded, quarrelling broke out as to whose turn it was to use the machine. This was made of cast iron and very strongly built and it was originally designed for use on farms in Britain before power driven models were invented. It was operated by two persons working together but it was possible to attach a small petrol engine to it, this was not done, however, because the women lacked the technical skill to maintain these engines and the money to pay for the petrol which, in any case, would often have been unobtainable. A number of the Societies were two and three days walking away from a motor road and even farther from petrol supplies.

Once the women had become accustomed to operating the mills they found that they could save themselves many hours of work a week as well as a great deal of effort: so that the women in the neighbouring villages, who had been watching the



(30) - A wash house in Bamenda, fed with water from the storage tank on the left

(31) Another water scheme in Bamenda, the overflow pipe from the storage tank provides a shower for the children



experiment with interest, were very soon asking for mills also. When Independence came, in 1961, there were over 300 mills in use and the Societies had a total membership of more than 30,000 women whilst the movement had spread down to the coastal areas and had cut right across the tribal boundaries.

The programme did not end, however, with the provision of these mills, they were, in fact, the "bait" to get it started. With the increased leisure that the mills gave them the women now started many development projects in their villages. They dug roads so that lorries could come in to take out their produce and they built meeting houses, at their own expense, in which to hold the classes in cooking, child welfare, and related subjects, which they now felt that they needed: And, on their Society farms, they were willing to carry out experimental planting of new strains of maize which they would have hesitated to do on their own farms, quite understandably, for fear of failure. These proved successful, with the result that they were universally adopted and the hungry season, when the old corn was finished and the new not yet ready, became a thing of the past. The Medical Department too, was offered the use of the meeting houses for clinics, something which very few villages had had before through lack of suitable premises, so that health, in general, improved.

The organisation of these classes presented some difficulties at first. Trained Home Economics teachers were few and far between and the nature of the terrain, which was mountainous with few roads, made travelling difficult. It was decided therefore, to bring the women to the teachers rather than the other way round — so that the Societies were formed into Groups of a dozen or so villages and a large meeting house, capable of seating two to three hundred women, was built in the most central. The teacher then went there to hold the classes, on the women's traditional rest day, and the women walked in from the surrounding district, some of them as much as ten miles — but without complaint. By these means the maximum use was made of the teacher, and classes went on all day. At the same time the women got to know each other. As a follow up to these classes a 1& girls' school was hired during the school holidays and two women from each of a number of villages were given a one week's residential course on the understanding that, when they returned to their villages, they would pass on what they had learnt to the other members — and is they did most successfully.

A constantly recurring problem was the damage done to the women's farms by straying cattle. Between the two world-wars large herds of cows had been brought in from Northern Nigeria, by the Administration, to graze on the abundant grassland. The cattle owners paid a poll tax to the Local Authorities but they had little in common with the indigenous inhabitants, so that cattle disputes were a frequent occurrence and, when they ended up in court, women usually lost their case. Several, in fact, had been sent to gaol for attacking the cattle. Now, the women decided to fence in their farming land with barbed wire, a matter of some square miles, and, after this had been done in one or two districts, life became more peaceful.

Water was another problem in most areas, the numerous small streams which cascaded down the hillsides in the rains often dwindled to a mere trickle in the dry season. The obvious solution was to run the water into storage tanks in the villages, which would then fill up over night, and this was done in a number of villages, wash houses also being built besides the tank. All these projects were carried out by the women themselves with financial assistance only when it was necessary to purchase something not available locally — such as cement. The women also made the bricks for

the meeting houses and carried the bamboos for rafters and their husbands did the building. By now, these had come to realise that they benefitted as much from the work of the Societies as their wives did, and, with a better balanced and more plentiful diet, the children's health was noticeably improving.

The Agricultural Department also now used the establishment of the Societies to attach agricultural assistants to work especially with the women so that, amongst other developments, these were at last persuaded to farm along the contours instead of vertically down the hill side; a practice which, until then, they had refused to give up although it had caused severe erosion.

By the time Independence came the women had started two co-operatives, each member contributing the equivalent of two shillings, as share capital. The shops stocked things which were not easily obtainable elsewhere, such as corn mills, and barbed wire and agricultural implements, and prices were kept as low as possible — and fixed. Each was run by a committee of women but the shopkeeper was a retired school master, because of the paper work. Ninety nine per cent of the members were illiterate, when the Societies started and, although more than four thousand had since learned to read and write in classes organised for them, advanced book keeping was still beyond them. They kept a sharp eye on the shopkeeper however, and made it clear that they were in control.

Organisers were, of course, necessary and, perhaps rather oddly in a women's organisation, with the exception of the Home Economics Teachers, these were all men, because the work involved a great deal of travelling, much of it on foot or by bicycle over very difficult country. The organisers were often away from home for a week or more at a

(32) A women's meeting in a village in the Cameroons, to discuss the completion of the meeting house on the left.



time and had also to carry quite large sums of money on them, since it was part of their work to collect the instalments due from each Society for the machines, when they called to service these. Men were chosen however, who were sympathetic to the women and who genuinely wished to help them.

Each Society elected its own two Headwomen, who were responsible for the day to day decisions, and this they did extremely well, showing both authority and initiative: although they could usually neither read nor write they possessed excellent qualities of leadership. Those responsible for collecting the money from the members could only keep their records on a notched stick - but they seldom made mistakes ~~failed to pass the money on to the organisers.~~

The salaries of the full time organisers were paid by the Division of Community Development but most of the other expenses were met by the women themselves, through the sale of surplus produce or handicrafts, and they were very proud of their self sufficiency. This stood them in good stead when Independence came in 1962, and brought about many administrative changes, amongst them the transfer of most of their organisers to other posts with the result that, for some time, the women were left very much on their own. However, they proved well able to carry on by themselves and can fairly claim that the marked rise in the standard of living for everyone living in the Province is very largely due to their efforts.

There are, of course, a number of rural women's organisations in Africa now but this account may help to show the way in which suitably selected Intermediate technologies might be of assistance to them.

Women's Institutes in Sarawak

A similar approach was used to start a rural women's organisation in Sarawak, on the island of Borneo, in S.E. Asia. Although the initial technology chosen in this case did not, in the event, prove entirely satisfactory, and others had to be substituted, it nevertheless afforded the means of making the first approach to the women and the movement has continued to develop until, fifteen years later, it is one of the most successful in Asia, with more than 370 Institutes and a membership drawn from 8 races.

The Sarawak Federation of Women's Institutes, as it is called, (and it should perhaps be mentioned here that "Institute" is used as an alternative to "club" or "society" and not in the academic sense) came into being when the Department of Agriculture decided that a rural women's organisation was needed to help its extension service make contact with the women. The Department however, did not dictate what form this organisation should take but merely offered to meet the salary and expenses of an expatriate organiser for the first three years, in which it was assisted by the Asia Foundation. This was in 1962.

Sarawak is essentially rural in outlook, there are no large towns, even the capital, Kuching, is really several villages strung together. It is low lying and swampy, the terrain rising gradually to the range of mountains which form the border with Indonesian Borneo on the one side and Sabah, on the other, and a large part is covered by dense jungle. It is also honeycombed with rivers and these afforded the best means of travel when the programme began although more roads have since been built, even so, travel is still difficult and sometimes dangerous, in the rainy season.

The population is a mixed one, numbering under a million. There are four main languages, Malay, Iban, Chinese and English, but there are also those belonging to the minority groups so that communication can be a problem, although Malay is widely spoken in the towns. The indigenous inhabitants are the Dayaks, who can be subdivided into the Land Dayaks, or Bidayuhs; and Sea Dyaks, or Ibans; the former number about 60,000, the latter form the biggest racial group, numbering about 250,000. They each have their own language. Both groups are animists by religion and mostly live inland in the famous Longhouses (which can briefly be described as a village sheltering under one roof). The Chinese are the next most numerous race and, whilst some of them earn their living as farmers and rubber planters, the majority work as shopkeepers and skilled artisans in the towns and they dominate the export trade in rubber, pepper and sago. They are mainly Buddhists or Christians. Next, come the Malays, who are Muslims. They were politically the most important race when Rajah Brooke first came to Sarawak, in the early 19th century, and many of



(35) Land Dayak members of the Women's Institutes in Sarawak leaving their longhouse after a meeting

(36) The first International seminar held in Sarawak



them are still to be found in the Administration, although there are others who earn their living by fishing. Then there are the less numerous but still important groups, such as the Melanaus, at the coast, and the Kelabits and Kedayans in the interior.

In these circumstances, it was clear from the start that the movement must be multi racial in outlook, as well as multi lingual and that it must also be non sectarian and non political, whilst the programme would have to be extremely flexible to cope with the needs of people with such widely differing backgrounds. It was also clear that, whilst it was to be essentially a rural movement, in the absence of any similar organisation for the women living in the towns, it would probably need to cater for these women also, but this did not present a great problem since none of these towns was of any size and the life of the women living in them was very similar to that of those living in the rural areas.

The organiser appointed to set up the movement went first to live in a Land Dayak area, some thirty miles from the capital. Here for the first few months she did little more than walk round making herself familiar with the district and the way of life and getting to know the more important people, such as the school teachers and midwives and local government officials; With the aid of one of these, a Chinese woman married to a Dayak, she, then made contact with the women in four selected longhouses, to whom, in due course, she was able to suggest that their work would be made easier if they were to have a machine to help them to husk their paddy. When they agreed to this four were imported from Japan. In the event, although their arrival caused great interest, they proved something of a disappointment. They were designed primarily for operation by two fairly sturdy men and proved rather too heavy for the women, in addition they were meant chiefly for the use of a single family and, unlike the corn mills, were unable to stand up to the continuous pounding of fifty, or more, women. Although the four villages continued to operate them therefore, more were not imported. However, they had served one purpose — to break the ice. They had become a talking point in longhouses far and wide and the effort to help them, if not entirely successful, had at least gained the women's confidence. Whilst attempts continued to find another more suitable hand operated huller therefore, other technologies were suggested instead. Engine operated mills, such as those found in many parts of Asia, were deliberately not introduced because these would have removed too much of the vitamin B content from the rice. As more Institutes were started therefore: and this time at the request of the women themselves, schemes for the provision of piped water from a nearby stream, or a pump to lift it up a steep river bank, were put forward instead.

All these projects required much preliminary discussion, so that, gradually, these meetings slipped into regular ones and it was possible to introduce an agricultural or Home Economics programme, with the aid of the Department, and through the use of the Extension workers. After a dozen or so Institutes had been successfully set up the Organiser moved on to work in another district but not before she had trained a local woman to act as full time organiser for the Division and also arranged for the Chinese teacher, who had played such an important part at the beginning, to become a part time District Supervisor. For this she received a small monthly honorarium in return for agreeing to attend the meetings of the five Institutes near where she lived (and other Supervisors were appointed to cover the other Institutes, as they were opened). She did this as unobtrusively as possible; the women made their own decisions, but she was available if these needed advice and could also help them with

any paperwork – for very few of the members could read or write, at that time.

About this time also, a National Office was set up in Kuching and a National Organiser appointed with the intention that she should take over from the expatriate Organiser when the latter's three year contract ended. As Administrative Secretary she has been in charge ever since and a very great deal of the success of the Institutes has been due to her outstanding initiative and hard work.

The movement was now well established amongst both the Land and the Sea Dayaks and work therefore started amongst the Malay women; this was a great step forward because, although strict purdah is not practised in Sarawak, Muslim husbands do not encourage their wives to leave home too often. So that for some of them, the Institute meetings afforded the first real opportunity the women had had to mix freely with other women, apart from those of their family. Very soon these members were asking for literacy classes so that they could learn to read Malay and it was indicative, of the approval that the religious leaders now gave to the organisation that many of these classes were held in the local mosques. Indeed, the men of all races, having viewed the initial setting up of the Institutes with some alarm had, by now, become extremely helpful and actively encouraged their wives to join.

Gradually, working on the lines described, the Institutes spread to all the five Divisions into which Sarawak was then divided, whilst their activities widened. The members did what they could to help the more unfortunate in their villages, and several times raised funds to assist the victims of the disastrous floods to which the country is liable. They made money by selling food that they had cooked at the regattas which are a feature of life in Sarawak, and they funded most of their activities themselves although, as these became better known, they also attracted assistance from other Women's Organisations overseas, who became interested in their programmes.

In 1967, the small rented office, in Kuching, gave way to a large purpose built building; paid for by Government, in recognition of the Institutes' work, and consisting of a large meeting hall and offices but also dormitories in which women from outside Kuching could be accommodated when attending courses there, and also the visitors from overseas who now came regularly to see their work.

By this time Chinese and Melanau women and even those from the small Indian and Sri Lankan communities had also become members, so that the movement could claim to be one of the few which had cut completely across the racial barriers. This had its problems however, when it came to programme planning because it was obviously impractical to insist that each individual Institute must be multi-lingual, they were therefore allowed to choose which language they would use during their meetings and, whilst members from another race were always welcome to attend, they had to be prepared to speak that language. At District Committee and at Divisional and National Committee level also, when these committees came to be formed, the two official languages were Malay and English, and delegates had to be able to speak one or another. All literature put out to the Institutes themselves was in four languages, Malay, Iban, Chinese and English – as was the Radio Programme which was not started as a regular feature and aimed at the Institutes in the interior, so that they could keep in touch. This was written and broadcast by the members themselves, with help from Radio Sarawak, and the Institutes were given small transistor radio sets on which to listen to these programmes.

The educational programmes were kept as flexible as possible, to cater for all,

tastes. The better educated women in the towns wanted different things to those in the rural areas and this was allowed for but, the linking up of the various committees, starting at the lowest level with the District Committee, ensured that the rural women were consulted as much as the ones living nearer Kuching. And the District Supervisors played a key role in this; in view of the very difficult travelling conditions it would have been impossible, as the number of Institutes increased, for the Divisional organisers to have visited every one of them regularly themselves. Whilst community development projects continued to be undertaken in the villages, as part of the Institutes' programmes, it proved no longer necessary to use these as an inducement to form an Institute, the women had seen for themselves the benefits of membership and that they could achieve a great deal by working together which had been impossible to them previously. In recent years they have pioneered the establishment of day care centres for children and are in the process of setting up a marketing organisation for member's handicrafts, they have also established a contingency fund to help any member in serious financial difficulty and they have acted as hosts to a number of important international seminars and have sent their own delegates to others outside Sarawak, thus playing an important part in the fostering of better international relationships. A number of the rural Institutes now have their own paddy plot as well as vegetable plots and fish ponds and some have built their own meeting houses. They are no longer attached to the Agricultural Department but come under the Prime Minister's office but, although they are generously funded by the Government, which recognises the important part they play in Sarawak now; they are autonomous and their policy is determined by their own Council, which is elected by the members annually.

They have come a long way in fifteen years, they have undoubtedly made a great contribution to improving the quality of life in Sarawak for everyone, and they have shown what women can achieve, given the opportunity

The rural women everywhere are the salt of the earth, they are eager and willing to learn and determined to give their children a better life than they have had. They are excellent material to work with and the hope for the future in the developing countries and it is only when we recognise this, in our development programmes, and help them to help themselves that these are likely to be effective.

APPENDIX

ADDRESS OF ORGANISATIONS CONCERNED WITH INTERMEDIATE TECHNOLOGY AND/OR RURAL DEVELOPMENT OVERSEAS

AFRICA

African Training and Research Centre
for Women,
U.N. Economic Commission for Africa,
P.O. Box 3001
Addis Ababa,
Ethiopia.

Arusha Appropriate Technology Pilot
Project
P.O. Box 764
Arusha
Tanzania.

Appropriate Technology Centre
Gaborone
Botswana.

Botswana Enterprises Development Unit
P.O. Box 436
Gaborone
Botswana.

Basotho Enterprises Development
Corporation
P.O. Box 1216
Maseru
Lesotho.

Bungoma Farm Training Centre
P.O. Box 46, Bungoma,
Western Province
Kenya:

Centre for Advisory Services in
Technology,
ASTRAD Dept. of Engineering
Gourah Bay College
University of Sierra Leone
Freetown, Sierra Leone.

Department of Engineering
Faculty of Technology
National University
Addis Ababa, Ethiopia.

Department of Food Science and
Technology
University of Ife
Ile-Ife
Nigeria.

Department of Agricultural Engineering
The University
P.O. Box 643
Morogoro
Tanzania.

Department of Agricultural Engineering
Njala University College
Freetown
Sierra Leone.

Euro Action, Sahel
B.P. 624
Niamey
Niger.

Farm Machinery Testing Unit
Agricultural Research Station
P.O. Box 158
Lilongwe
Malawi.

Forest Products Research Institute
University P.O. Box 63
Kumasi
Ghana.

Farm Machinery Research Unit
Regional Research Station
P.O. Box 11 Magoye
Zambia.

International Institute of Tropical
Agriculture
PMB 5320
Ibadan
Nigeria.

Institute for Agricultural Research
Ahmadu Bello University
Samaru PMB 1044
Zaria, Nigeria.

Intermediate Technology Workshop
P.O. Box 401
Waff Road
Zaria
Kaduna State. Nigeria.

Kinna and Rapsu Irrigation Schemes
P.O. Box 596;
Meru
Kenya.

Projects Development Agency
3 independence Lay Out
P.O. Box 609
Enugu, Nigeria.

Rural Industries Innovation Centre
P.O. Box 18
Gabarones
Botswana.

Small Industries Development
Organisation (SIDO)
P.O. Box 2476
Dar es Salaam
Tanzania.

Societe Africaine d'Etude et de
Developpement (SAED)
B.P. 593
Ougadougou
Upper Volta.

Serowe Brigade Development Trust
Box 121
Serowe
Botswana.

Small Farm Equipment Unit
Tikonko Agricultural Extension Centre
P.O. Box 142
Bo, Sierra Leone.

Technology Consultancy Centre
University of Science and Technology
University P.O.
Kumasi
Ghana.

Timber Industries Project
P.O. Box 30513
Nairobi
Kenya.

Tanzania Agricultural Machinery
Testing Unit (TAMTU)
P.O. Box 1389
Arusha
Tanzania.

Upper Volta Centre for Training Rural
Craftsmen
Ougadougou.
Upper Volta.

Village Technology Unit
c/o UNICEF
P.O. Box 44145
Nairobi
Kenya.

ASIA

Appropriate Agricultural Technology
Cell

Bangladesh Agricultural Research
Council
130 C, Road 1
Dhanmandi
Dacca 5

Bangladesh.

All India Khadi and Village Industries
Commission
Gramodaya
3 Irla Road
Vile Parle (West),
Bombay 400 OS6
India.

Appropriate Technology Cell
Ministry of Industry and Civil Supplies
Udyog Bhavan
New Delhi
India.

Appropriate Technology Development
Association
P.O. Box 311
Gandhi Bhawan,
Lucknow, 226 001
Uttar Pradesh, India.

Appropriate Technology Unit
India Institute of Technology
Pawai
Bombay 400 076
India.

Appropriate Technology Development
Organisation (ATDO)
P.O. Box 1306 i B
F. 7/1 St N.47th
Islamabad
Pakistan.

Appropriate Technology Group
9 Stanley Place
Mirohana
Nugegoda
Sri Lanka.

Asian Institute of Technology
P.O. Box 2754
Bangkok
Thailand.

Asian Vegetable Research &
Development Centre,
P.O. Box 42
Shanhua, Tainan 741
Taiwan.

Agricultural Tools Research Centre
P.O. Box 4
Suruchi campus
Bardoli 394601
India.

Appropriate Technology Cell
Allahabad Polytechnic
Allahabad 211002
Uttar Pradesh
India.

Bedan Urusan Tenaga Kerja Sukarela
Indonesia (BUTSI)
Indonesian Board for Volunteer Service
Jalan Halimun 4
P.O. Box 3290
Jakarta
Indonesia.

Cell for Application of Science and
Technology to Rural Areas (ASTRA)
India Institute of Science
Bangalore 650 012
India.

Centre for Development Studies
Aakulam Road
Ulloor
Trivandrum 695 011
Kerala, India.

Central Food Technological Research
Institute
Mysore 570013
India

Central Arid Zone Research Institute
Jodhpur
Rajasthan
India.

Centre for Science in the Villages
Magian Sangrahalaya
Wardha 442001
India.

Development Technology Centre
Institute of Technology
P.O. Box 276
Bandung
Indonesia.

Development Workshop
224 Saba Shomali
Tehran
Iran.

Eco-Development Cluster
Bu-Ali Sina University
Hamadam,
Iran.

Foundation for Research in Community
Health
Dhekawade
P.O. Awas
Alibag Taluk
District Kolabe
Maharashtra
India.

- Gobar Gas Experimental Station
Ajitmal
Etawah
Uttar Pradesh
India.
- Grain Storage Research and Training
Centre
Indian Grain Storage Institute
Hapur
Uttar Pradesh
India.
- Garg Consultants
C.10/1 River Bank Colony
Lucknow
Uttar Pradesh
India.
- IRRI, PAK
73a Satellite Town
Rawalpindi
Pakistan.
- International Rice Research Institute
(IRRI)
Department of Agricultural Engineering
P.O. Box 933
Manila
Philippines.
- Indian National Buildings Organisation
Nirman Bhavan
New Delhi 1
India.
- International Crops Research Institute
(ICRISAT)
1-1 1-56 Begumpet
Hyderabad.50016
India.
- Lanka Jatika Sarvodaya Shramadna
Sangamaya Inc.
77 de Soysa Road
Moratuwa
Sri Lanka.
- Mechanical Engineering Research and
Development Organisation
Madras
India.
- Malaysian Agricultural Research and
Development Institute
P.O. Box 208
Sungai Besi
Serdang
Selangor.
- National Research Centre, Office-of the
transfer of Technology
El Tahrir Street
Dokki
Cairo
Egypt.
- Proyek Teknologi Tepat
Dian Desa
Jalan Kerta Muja Muju 8
Yogyakarta
Indonesia.
- Regional Adaptive Technology Centre
Mindanao State University
Marawi City
Philippines.
- United Mission to Nepal
P.O. Box 126;
Kathmandu
Nepal.
- Water Development Society
C2 & C5 Industrial Estate
Moula Ali
Hyderabad 500 040
India.
- EUROPE
Conservation, Tools and Technology
(CTT)
161 Clarence Street
Kingston
Surrey KT 1 QT
England.
- Centre for Overseas Pest Research
College House
Wrights Lane
London W8 5SJ
England.

Centre d'Etudes et d'Experimentation.
du Machinisme Agricole Tropical
Parc de Tourvoie
92 Antony
Hauts de Seine
France.

Centre for World Development
Education
25 Wilton Road
London SW1V1JS
England.

Fund for Research and Development of
Africa (FRIDA)
Africa Centre
38 King Street
London WC2 8JJ
England.

Group de Recherches sur les Techniques
Rural (GRET)
34 Rue Dumont d'Urville
75116 Paris
France.

Intermediate Technology Development
Group
9 King street
London WC2E 8HN
England.

Ministry of Overseas Development
Eland House
Stag Place,
London S.W.1.
England.

National Centre for Alternative
Technology
Llywyngwern Quarry
Machynlieth 2 4 0 0 1
Powys, Wales.

National Institute of Agricultural
Engineering
Overseas Liaison Department
Wrest Park
Silsoe, Bedfordshire
England.

Steering Committee on Wind Energy in
Developing Countries
Department of Physics
Technische Hogeschool
Postbus 5 13, Eindhoven,
Netherlands.

Stichting Technische Ontwikkeling
Ontwikkelings Landen (TOOL)
Technical Development for Developing
Countries
Mauritskade 61a
Amsterdam
Netherlands.

Swedish Agency for Research
Co-operation with Developing
Countries (SAREC)
Swedish International Development
Authority
S.105.25 Stockholm
Sweden.

S&s Association for Technical
Assistance
Asylstrasse 41
Post Fach 8030
Zurich
Switzerland.

Tropical Products Institute
56/62 Grays Inn Road
London WC1X 8LU
England.

Technology Transfer Co-ordination
Centre
c/o IPA Holzgartnerstrasse 17
D.7000 Stuttgart 1
Germany.

NORTHAMERICA
Alternative Sources of Energy Inc.
Route 2, Box 90A
Milaca
Minnesota 56353
USA.

Appropriate Technology International
U.S. Department of State
Washington D.C. 20523
USA.

Brace Research Institute
Macdonald College
McGill University
Ste Anne Bellevue 800
Quebec HOA 1CO
Canada.

Canadian International Development
Agency
122 Bank Street
Ottawa
Ontario K1A 0G4
Canada.

Canadian Hunger Foundation
75 Sparks Street
Ottawa
Ontario K1P 5A5
Canada.

International Bank for Reconstruction
and Development
1818 H. Street N.W.,
Washington DC 20433
USA.

International Development Research
Centre
P.O. Box 8500
Ottawa K1G 3H9
Canada.

National Centre for Appropriate
Technology
P.O. Box 3838, Butte
Montana 59701
USA.

Rain
2270 N.W. Irving
Portland
Oregon 97210
USA.

Rodale Press Research Centre,
33 East Minor Road
Emmaus
Pa. 18049
USA.

Technical Assistance Information
Clearing House (TAICH)
200 Park Avenue South
New York NY 10003
USA.

Transnational Network for Appropriate
Technologies (TRANET)
P.O. Box 567
Rangeley
Maine 04970
USA.

US Agency for International
Development (AID)
Department of State
Washington DC 20523
USA.

Volunteers in Asia
Box 4543
Stanford
California 94305
USA.

Volunteers in Technical Assistance
(VITA)
3706 Rhode Island Avenue
Mt Rainier
Maryland 20822
USA.

Womens World Banking
P.O. Box 1691
Grand Central Station
New York NY 10017.
USA.

United Nations Organisations with sections dealing
with rural development programmes

Food and Agricultural Organisation
(FAO)
Via delle Terme di Caracalla
00100 Rome
Italy.

United Nations Children's Fund
(UNICEF)
United Nations
New York NY 10017
USA.

United Nations Development
Programme (UNDP)
United Nations
New York NY 10017
USA.

International Labour Organisation
(ILO)
CH 1211, Geneva 22
Switzerland.

United Nations Industrial Development
Organisation (UNIDO)
P.O. Box 707
A.101 1, Vienna
Austria.

United Nations Educational, Scientific
and Cultural Organisation (UNESCO)
Place de Fontenoy
75 Paris 7^e
France.

The African Training & Research Centre
for Women,
United Nations Economic Commission
for Africa
P.O. Box 3001
Addis Ababa
Ethiopia.

United Nations Environmental
Programme
Nairobi
Kenya.



Manufacturers of some of the equipment suggested

Addresses are given on page 77.

Hand seed planters

Cossul and Co. PVT Ltd. India
Richmond Gibson Ltd., U.K.

Seed drills and wheel hoes

American Spring and Pressing Works
PVT. Ltd., India.

Ce Co Co, Japan
I.R.R.I., Philippines.

Bird scarer

Crop Protection Corporation, India
Kumaon Nursery, India
Ce Co Co, Japan

Hand pumps

Ce Co Co, Japan
H.J. Godwin, U.K.
Dandekar Brothers, India
Kumar Industries, India
Lee Howl and Co. Ltd., U.K.

Barnaby Climax Ltd., U.K.

Cossul and Co. PVT, Ltd., India
Kalayaan Engineering Co. Inc.,
Philippines
D.H. Farm Implements, Philippines
PompesGrillot, France

Hydraulic rams

John Blake Ltd., U.K.
Ce Co Co, Japan
Green and Carter Ltd., U.K.
Godbole and Sons, India

Hand Maize shellers

Ce Co Co, Japan
Cossul and Co. PVT. Ltd., India
Dandekar Brothers, India
R. Hunt and Co. Ltd., U.K.
Allied Trading Co., India
Ubungo Farm Implements, Tanzania
Rajasthan State Agro Industries
Corporation Ltd., India

Groundnut huskers, manually operated

Ubungo Farm Implements, Tanzania
Siscoma, Senegal
Harrap Wilkinson, U.K.
Dandekar Brothers, India
Hindsons PVT, Ltd., India (foot
operated),

Foot-operated threshing machines

Ce Co Co, Japan
American Spring and Pressing Works
PVT, Ltd., India
Cossul and Co. PVT, Ltd., India
Comilla Co-operative Karkhana Ltd.,
Bangladesh

Winnowers

Cossul and Co. PVT, Ltd., India
Kumaon Agri-Horticulture Stores,
India
Ce Co Co, Japan
R. Hunt and Co. Ltd., U.K.
Rajasthan State Agro Industries
Corporation Ltd., India

Grinding Mills hand operated

R. Hunt & Co. Ltd., U.K. (No. 3
mill)
Ndume Products Ltd., Kenya

Rice hullers

Ce Co Co, Japan
John Gordon and Co. Ltd., U.K. (for
family use)

Palm nut crackers

Harrap Wilkinson Ltd., U.K.

Sugar cane crushers

Ce Co Co, Japan
Kirloskar Brothers Ltd., India
(animal driven)

Hand tools

Chillington Tool Co. Ltd., U.K.

Cossul and Co. PVT, Ltd., India

Kumaon Agri-Horticulture Stores,
India

Kumar Industries, India

W. Tyzack Sons. and Turner Ltd.,
U.K.

Ubungo Farm Implements; Tanzania

English Tools Ltd., U.K

Cottage industries

Ce Co Co. Japan

Manufacturer's addresses

Bangladesh
Comilla Co-operative Karkhana Ltd.,
P.O. Box 12,
Comilla.

Crop Protection Corporation
Niranjan 6th floor
99 Marine Drive
Bombay 400 002
(Post Bag 2702).

India

Allied Trading Co.,
Railway Road,
Ambala City
Haryana.

Kumar Industries
Edathara 6786 11
Palghat District
Kerala.

American Spring and Pressing-Works
P.O. Box 7602
Malad
Bombay.

Kirloskar Brothers
Udyog Bhavan
Tilak Road
Poona 411 002.

Dandekar Brothers,
Sangli
Maharashtra.

Tata Iron and Steel do.
43 Chowringhee Road
Calcutta 16.

Cossul and Co. PVT, Ltd.
Industrial Area
Fazalgunj
Kanpur.

Godbale & Sons
New Ramdaspoth
Kachipura
Kanpur 1.

Rajasthan State Agru
Corporation Ltd.
Vivat Bhawan
C. Scheme
Jaipur, 302 0 0 6
Rajasthan.

Industrial
Japan
Ce Co Co
P.O. Box 8
Iboraki City
Osaka Prefecture 567.

Kumaon Agri-Horticulture Stores
P.O. Kashipur
District Nainital
Uttar Pradesh.

Philippines
Kalayaan Engineering Co. Inc.
4255 Emilia Street
P.O. Box 655 MCC,
Makati, Rizal.

Kumar Industries Ltd.
Edathara 6786 11
Palghat District
Kerala.

D.H. Farm Implements
Km 1 National Highway
Roxas City.

Hindsons PVT. Ltd.
The Lower Mall
Patiala
Punjab.

Kumaon Nursery
Ramnager
Nainital
Uttar Pradesh.

Tanzania
Ubongo Farm Implements
P.O. Box 2699
Dar es Salaam.

United

Kingdom

R. Hunt and Co. Ltd.

Atlas Works

Earls Colne

Essex CM16 4AQ.

Harrap Wilkinson Ltd.

North Phoebe Street

Salford M5 4EA.

Barnaby Engineering Co.

Bourne Road

Bexley

Kent DA5 1L5.

H.J. Godwin

Quenington.

Cirencester

Gloucestershire GL7 5BX.

John Blake Ltd.

P.O. Box 43

Royal Works

Accrington

Lancashire BB55JP.

Green and Carter Ltd.

Vulcan Ironworks

Kingsworthy

Winchester

Hampshire SO23 7QF.

John Gordon and Co. Ltd.

196a High Street

Epping

Essex CM16 4AQ.

W. Tyzack Sons, and Turner Ltd.

Little London Works

Sheffield S8 0UE.

English Tools Ltd.

Clarington Forge

Wigan

Lancashire.

Chillingto" Tool Co. Ltd.

P.O. Box 45

Hickman Avenue

Wolverhampton WV t 2BU.

Kenya

Ndume Products Ltd.

P.O. Box 62

Gilgil.

France

Pompes Grillot

84007 Avignon

Rue de l'Observance

B.P. t 18.

USEFUL BOOKS

AGRICULTURE

- Animal drawn equipment and hand operated machines 1974
 U.N. Industrial Development Organisation, Vienna, Austria
- Improvement of the Kiskisan Mill. Arboleda 1975
 International Rice Research Institute, Philippines
- Small scale storage and drying of paddy in Bangladesh. Merrick Lockwood:
 Appropriate Agricultural Technology Cell, Dacca, Bangladesh.
- Farm implements for Arid and Tropical Regions. Hopfen. 1962
 U.N. Food and Agricultural Organisation, Rome.
- Small Farm Grain Storage. 3 Vols. Lindblad. 1977
 Volunteers in Technical Assistance, 3706 Rhode Island Avenue, Mt. Rainier, Maryland
 20822, USA.
- Series of complete technical drawings of various items of farm equipment.
 Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

BIO G A S

- Gobar Gas > why and how?
 Khadi and Village Industries Commission, 3 Irla Road, Vile Parle, Bombay.
- Methane; planning a digester. 1976
 Prism Press. Book Representation Ltd.; 37 Store Street, London WC1E 7BS.
- Small Scale Bio Gas plants in India. 1976
 Canadian Hunger Foundation, 75 Parks Street, Ottawa, Canada.
- Methane Digestors. 1973
 John Fry. Intermediate Technology Publications Ltd.
 9 King Street. London WC2E 8HN.

BUILDING

- Manual on Building Maintenance, Vols. 1 & 2. 1976
 Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.
- Bamboo as a Building Material.
 Office of International Affairs, Dept. of Housing, Washington, USA.
- Manual of Building Construction.. Dancy 1975
 Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.
- Handbook for Building Home of Earth. .
 Office of International Affairs, Dept. of Housing, Washington, USA.
- Shelter. Simple Homes in Natural Materials.
 Whole Earth Truck Store, 558 Santa Cruz Ave., Menlo Park, California 94025, USA.
- Housebuilding for Africans. Colchester.
 Longmans, Green & Co., U.K.

ENERGY

a) Wind

A survey of possible use of windpower in Thailand and the Philippines.
Heronemus.

1974

Agency for International Development, Washington D.C., 20523. USA.

Food from Windmills. Fraenkel.

Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

b) Water

Low cost development of small water power sites.

1971

Volunteers in Technical Assistance, 3706 Rhode Island Avenue,
Mt. Rainier, U.S.A.

Windmills and Watermills.

1970

Whole Earth Truck Store, 558 Santa Cruz Ave., Menlo Park, California 94025;
USA.

Small Scale Water Power. McGuigan.

Small Scale Wind Power. McGuigan.

Prism Press, Book Representation Ltd., 37 Store Street. London WC1E 7BS.

c) Solar

How to Build a Solar Steam Cooker.

Brace Research Institute, McGill University, Quebec, Canada.

d) General

Energy Primer. Ed. Merrill.

1975

Prism Press, Book Representation Ltd., 37 Store Street, London WC1E 7BS.

(Covers all forms of renewable energy.)

Pedal Power. McCullagh.

1977

Rodale Press, Emmaus, P.A. 18049, USA.

FISH CULTURE

Manual of Warm Water Fish Culture. Vancey.

1976

Mennonite Central Committee, Akron, Pennsylvania, USA.

-A Guide to Fish Culture.

Department of Agriculture, Sabah, Malaysia.

FOOD PRESERVATION

Home Techniques; Vol. 1.

U.N. Food and Agricultural Organisation, Via delle Terme di Caracalla, 00100, Rome,
Italy.

A Manual of Food Preservation. Islam.

1977

UNICEF, P.O. Box 58, Dacca, Bangladesh.

How to Salt Fish.

Volunteers in Asia, Box 4543, Stanford, California 94305, USA.

How to Make a Solar Drier for Agricultural Produce.
Brace Research Institute, McGill University, Quebec, Canada.

Technical Feasibility and Acceptability of Sun Dried Vegetables in Bangladksh.
Appropriate Agricultural Technology Cell, Dacca, Bangladesh.

Sun Dry Your Fruit and Vegetables.
US Department of Agriculture, Washington D.C. 20250, USA.

Sun Drying of Fruit and Vegetables, Jackson & Mohammed.
U.N. Food and Agricultural Organisations, Via delle Terme di Caracalla, 001 00, Rome,
I t a l y .

SOAP MAKING

The Preparation of Soap.
TOOL, Mauritskade 6 la, Amsterdam, Netherlands.

Introduction to Soap Making.
Christian Relief and Development Assn., P.O. Box 5674, Addis Ababa, Ethiopia.

The Good Idea - Soap Making.
German Adult Education Association, P.O. Box 9298, Accra, Ghana.

WATER & IRRIGATION

Water Treatment and Sanitation. Mann and Williamson. 1976
Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Manual on the Automatic Hydraulic Ram. S.B. Watt. 1975
Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Chinese Chain and Washer Pumps. S.B. Watt. 1976
Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Bamboo Piping.
Christian Relief and Development Assn., P.O. Box 5674, Addis Ababa, Ethiopia.

Hand Dug Wells and their Construction. S.B. Watt. 1977
Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Salawé Pump.
TOOL, Mauritskade 6 la, Amsterdam, Netherlands.

Hand Pumps for Village Wells.
Volunteers in Technical Assistance, 3706 Rhode Island Ave., Mt. Rainier, Maryland
20822, USA.

Bamboo Tube Well Irrigation. Rahman. 1973
Bangladesh Academy for Rural Development, Comilla, Bangladesh.

Hand Pump Maintenance. Pacey.
Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

HANDBOOKS dealing with a numb& of subjects, BUYER'S GUIDES, etc.

Guide book for rural, cottage and small scale industries and paddy cultivation.
Ce Co Co, P.O. Box 8, Ibaraki City, Osaka, Japan.

Village Technology Handbook.

Volunteers in Technical Assistance, 3706 Rhode Island Ave., Mt. Rainier, Maryland
20822, U S A

Buyers Guide to low cost agricultural implements.

(Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Lik Lik Book.

Melanesian Council of Churches, P.O. Box 80, Lae, Papua New Guinea.

How to use Natural Energy, (Catalogues and handbook)

Conservation, Tools and Technology, 161 Clarence Street, Kingston, Surrey KT1QT,
England.

Home Techniques.

U.N. Food and Agricultural Organisation, Via delle Terme di Caracalla, 00100. Rome,
Italy.

Rural Technology Guides. Pad batch dyeing, Maize stripper. etc.

Tropical Products Institute, 56/62 Gray's Inn Road, London WCI X 8LU.

Appropriate Technology Source Book.

Volunteers in Asia, Box 4543, Stanford, California, USA.

First Steps in Village Mechanisation. MacPheison.

Tanzania Publishing House, Dar es Salaam, Tanzania.

Cloudburst 1 & 2.

Cloudburst Press Ltd., 1716 N. 45th St., Seattle, Washington, 98103, USA.

Simple Technologies for Rural Women in Bangladesh.

Women's Development Programme, UNICEF, Dacca, Bangladesh.

Home Making Handbook.

1971

Extension Service, US Dept. of Agriculture, Washington D.C., USA.

BIBLIOGRAPHIES

Wind Energy Bibliography.

Windworks, Box 329, Route 3, Mukwonago, Wisconsin, 53149, USA.

Economically Appropriate Technologies for Developing Countries. An annotated
bibliography. Marilyn Carr.

Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Women and World Development, an annotated bibliography. Buvinic.

Overseas Development Council, 1717 Massachusetts Avenue, N.W., Washington D.C.
20036, USA.

Experiences in Rural Development. Dejen and Smith.

Overseas Liaison Committee, American Council on Education, Eleven Deupont Circle,
Washington D.C. 20036, USA.

Bibliography of low cost water techniques. Bateman.

1974

Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Methane Generation, an annotated bibliography. Freeman and Pyle. 1911
Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

Women, a select annotated bibliography of TAICH holdings.
Technical Assistance Information Clearing House (TAICH), 200 Park Avenue South,
New York, NY 10003, USA.

GENERAL

Appropriate Technology for African Women. Marilyn Carr.
U.N. Economic Commission for Africa, Addis Ababa, Ethiopia.

Feasibility Survey on Productive/Income Generating, Activities for Women in
Bangladesh. 1977

Women's Development Programme, UNICEF, P.O. Box 58, Dacca, Bangladesh.

CONFERENCE REPORTS etc.

Report of the International Conference on Rural Development Technology. 1977
Asian Institute of Technology, Bangkok, Thailand.

Proceedings of the Workshop of Appropriate Agricultural Technology. 1975
Bangladesh Agricultural Research Council, 130c, Road 1, Dhanmandi, Dacca 5,
Bangladesh.

Proceedings of the World Food Conference. 1976
Iowa State University, Ames, Iowa, USA.

Village Technology in Eastern Africa. Report of Regional Seminar, 1976.
UNICEF, P.O. Box 44145, Nairobi, Kenya.

Women and World Development, AAAS Seminar, Mexico City 1975
Overseas Development Council, 1717 Massachusetts Avenue, N.W., Washington D.C.
200036, USA.

Development of Cottage Industries in Bangladesh. Austin. 1977
UNDP/ILO, Dacca, Bangladesh.

JOURNALS

Appropriate Technology. Quarterly.
Intermediate Technology Publications Ltd., 9 King Street, London WC2E 8HN.

ADAB News. Monthly.
Agricultural Development Agencies, 549F, Road 14, Dhamandi, Dacca, Bangladesh.

This is only a selection from the books now available on Intermediate Technology and
on women's development. More detailed book lists can be obtained from the following
organisations and also from many of the other organisations and publishers whose
addresses have already been given: -

Intermediate Technology Publications Ltd.,
9 King Street ;
London WC2E 8HN.

Volunteers in Technical Assistance,
3706 Rhode Island Avenue,
Mount Rainier.
Maryland 20822.
U.S.A.

TOOL,
Mauritskade 61a.
Amsterdam.
Netherlands.

Conservation, Tools and Technology,
161 Clarence Street,
Kingston.
Surrey KT1 1QT,
England.

Tropical Products Institute,
56/62 Grays' Inn Road,
London WC1X 8LU.