

PROBLEMS AND REMEDIES IN NATIVE COPRA PRODUCTION

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OF the permanent cash crops established to any extent by the Native peoples of the Territory, coconuts would be the oldest. In the early history of the Territory the coconut was a participant of the subsistence economy only. It was not until the latter part of the 19th Century when the German firm of Godeffry and Sons, with its Headquarters in Samoa, started buying coconuts instead of processed oil, that coconuts became of commercial value to the Natives of New Guinea. This was an incentive for the more enterprising to establish further stands. Plantings have been slow and, in many areas, to-day the small number of mature nuts is alarming. On the other hand where large stands are established they are not being worked to their maximum potential, although the high price which copra is bringing to-day offers a good incentive.

At this stage we can consider our most important problem in Native copra production. It is one, although of a temporary nature, that will be present for a long time and will influence the establishment, management and production of any cash crop. This is the Native attitude towards work, production and improved management.

The Native has a different understanding of work to the European and the gap between European modern economy and Native economy is extremely large. In European economy there is need for a steady cash income and to be the possessors of this our work must be continuous. Our economy forces us to improve—we are daily learning better methods of management and using improved facilities and machinery in production. These are the demands of our money economy.

In the Native society work had, and has, a social function and value and it is performed mainly to meet obvious needs, such as for a house or food. A different set of rules governs the labour; work is not continuous and any Native who is an owner of ground may, with limited work, become a producer but being a producer is not enough. The product must be such that it is of a certain standard and should be in sufficient quantity so that the returns are able to cater for more than the obvious needs.

The standard set by us is very high for the Native with his backward technology.

If he wishes to participate in the modern economy and become a successful independent producer, then readjustments must be made. He must be willing to rearrange his labour output, changing spasmodic work for continuous or regulated work. Also the acceptance of new and improved methods of planting, management, etc., must be present with a sense of responsibility. Pressure was used to increase the plantings in Papua. While pressure does and will serve a purpose, it is not the answer to the problem as it does little to create a new and favourable attitude towards production.

There is no ready tangible remedy to our first problem. Until there is a greater pressure from among the Natives themselves for a higher standard of living, incomplete education, poor management, lack of interest and continuous application will always be present and be our foremost problem to be met.

It was mentioned before that many coconut groves are not being worked to their maximum potential. Even if the desire for maximum production was present, the groves could not give their best due to haphazard establishment and poor management.

The most notable faults are:—

1. Close planting distances;
2. Poor selection of seed nuts; and
3. Unsuitable planting areas.

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The majority of Native growers have had the opportunity to view European plantations and see coconut spacing. Many have had the services and advice of Extension Officers; yet they still persist in planting too closely.

Let us now consider some reasons which may influence close planting in the eyes of the Native. Such factors as:—

1. Native custom;
2. Close planting as a maintenance saver;
3. Land fragmentation; and
4. Mode of establishment

are all worthwhile suspects.

The present generation is only following the planting practices of its forefathers who did not have the opportunities and services to learn better methods of establishment. Also the older generation was working with primitive tools so it is not surprising that only small areas were closely planted so as to make maximum use of the ground.

The average grower does not concern himself much with improved management such as in the establishment of beneficial ground-cover crops, e.g., *Centrosema* or *Pueraria*. He has noticed, especially in kunai grass areas, that groves planted on the 27 or 30 feet spacing require constant maintenance. He, with his close planting which may vary from 9 to 20 feet, sees that less work is required to control undergrowth. Even where groves have been marked out by Government Officers some years ago, the Natives are reverting back to their closer planting method for this reason.

Along the East Coast of New Ireland severe fragmentation of clan land has often been noted as the reason for closer planting. The owners of small scattered areas who require a certain number of nuts for subsistence, pig food and a cash income will always have a tendency to over-plant an area.

In the Islands region, it is a common practice for the Native to plant his food garden, down to nuts, directly after harvesting. As these areas are usually small he will plant too closely to save himself extra clearing work. This is most noticeable in areas where the secondary bush growth is large.

The small holder knows little about selection of his planting material and usually the most hardy nuts are the ones selected. In many cases ignorance and not laziness is responsible. In parts of New Ireland, selection is done, the biggest nuts usually being chosen. Due to the small size of the nuts in this District (6,000 to 7,000 nuts to the ton), some Natives are becoming size conscious. In many parts of the Territory I should imagine that sufficient good planting material is unavailable and this is so in most parts of New Ireland. Planting material is therefore being brought in from the Government Plantation at Baibara in Papua.

Often it has been noticed that the best areas are not always selected for planting; land distribution and ownership are avoidable factors. Many excuses are often given but the distance factor is usually the influential one. In the past the Native has been accustomed to plant in close proximity to the settlement because of defence purposes. The closest areas to a village are usually the most heavily planted irrespective of soil types and suitability.

With the planting of the nut the producer is little concerned with the size of the planting hole. He has been concerned with his subsistence gardens which require little cultivation, a digging stick being the only implement needed. He has observed that self-sown nuts mature and produce.

On the management side three notable factors adversely affecting copra production are:—

1. Irregular maintenance which results in secondary bush growth and the establishment of self-sown nuts.
2. The firing of the undergrowth in place of regular grass cutting.
3. The non-establishment of beneficial ground cover crops.

Poor establishment and bad management, besides causing a slight lowering in copra output, may even cause total loss of output. The results of such factors may be responsible for the establishment of economic insects. Where there is a high incidence of an economic insect in small, scattered, poorly attended plantings control is extremely difficult. This may be our biggest

problem with the *Axigastus campbelli* (Nut-fall bug), in the Lihir Island District where it is causing a 60 per cent. loss in Native copra production on the islands of Mali, Masahet and Mahuri.

Although coconuts have been with the Natives for some years he knows little about their requirements. In many areas to-day the small holder is improving his method of establishment by the planting in lines. Although the planting distances are still too close a step in the right direction is being made.

There is one service operating at present which is causing interest amongst the copra growers and which, if followed through, will greatly improve planting methods. This is the distribution of seed nuts forwarded from Papua. To what extent these seed nuts can improve the present method of establishment will depend on the supplying officer in each area. On the introduction of these nuts to an area I suggest that one family group be found who is prepared to clear at least one hectare. Supply the nuts and help in the making of the seed bed; this should be in a prominent place. Create a little activity on the lining of the area and diggings holes; get as much help as you can. After the planting of the nuts return to the block a few times to note the maintenance work being done. Do not be too forward in supplying other nuts to that village. If approached adopt the attitude that these nuts are special and that it is not everyone who can establish them correctly and that you are reserving them for the conscientious grower. In supplying the nuts make sure that they are established on the same lines as the first block. With further supplying of these nuts the chances are very high that future coconut plantings will be a vast improvement on the present Native establishments.

Features present to-day in a matrilineal inheritance group may have a bearing on the ease with which further establishment and expansion is being made. Prestige in the old society was based on personal ability. Such matters as the size of gardens, number of pigs owned, etc., were of importance. There was little time for the lazy members of the communities; they were present but they played no parts of importance in high village affairs. Under the old society a

"Bigman" could be guaranteed that his prestige, power and name would be carried on. To-day, where the social life is changing and family ties are not as strong as before, a "Bigman" cannot be assured that his name, work, etc., will be upheld by his relations. It is therefore possible at this stage of the changeover, that he is not willing to work hard and establish a permanent crop such as coconuts, unless he is assured that his direct descendants will benefit from his efforts.

Establishment of a Second Permanent Cash Crop.

I now mention many groups of people along the East Coast of New Ireland who have a cash crop established—coconuts—not working to its maximum potential, yet are establishing another permanent cash crop—cocoa. It is not difficult to see why this should be.

Territorial cocoa to-day is sold on the worlds market at £250 per ton. Copra is sold at £70 per ton. Native people who know little about establishment, maintenance, processing and work involved will naturally decide that cocoa is the better crop.

While an agriculture based on a monoculture is dangerous, the introduction of a higher priced second permanent cash crop will cause a lowering of interest in the lower priced established crop.

There is no quick solution to overcome these establishment and management faults.

Let us now turn to the more difficult side of Native copra production, the drying of the kernel for the market. Here we are not only faced with the failings of the small holder, but must also contend with technical problems.

To date Native produced copra has a poor name on the world's markets. The forwarding of under-dried copra results in a contaminated product at its destination. Its usage to-day is limited and can only command the poorer markets. Our ultimate aim is to guide the small holder into producing a first grade copra which can be used in edible oil production; such oils having a wide variety of uses and thus will find the better markets. On the introduction of strict copra inspection by qualified



officers, under-dried and inferior copra which previously was accepted is now an unacceptable product. Continual rejections resulted in a lowering of Native copra output as many small holders stopped making copra. Whereas copra grading adversely affected the operations of the co-operative organization it paved the way for improvement in Native copra production. Previously the Native producer was supplying an under-dried, inferior copra with a minimum amount of effort and poor facilities. He was having his product accepted and receiving almost the same cash returns as other producers who were supplying a good product. It is not surprising, then, that there were only odd producers trying to improve their product and maintain a good standard by continuous work and improved drying facilities.

I would like to mention at this stage the way copra inspection created the stimulus in the improvement of Native copra in the New Ireland District. Continual rejections of the copra being produced in the Nalik area resulted in a position being reached where the Co-operative Society would have to close down due to financial embarrassment. As this area is some 60 miles from Kavieng and as there are no Native owned trucks, the small producers who are in the majority were dependent on Co-operative transport. Many of the producers ceased to make copra and sold their coconuts to Chinese traders. It did not take them long to see that with the removal of the Society they lost:—

- (a) Transportation of their product and other trade goods; and
- (b) The competitive purchase price which Co-operatives force.

In view of the situation, and on it being explained that their driers were inferior, they agreed to the erection of hot-air driers. The Society would then operate again for a trial period of six months. To-day, after nine months, the rejection figure is approximately 4 per cent. and the majority of the copra is being accepted at Hot-Air or F.M.S. Grade.

Odd producers from other parts of the district have seen the driers and are now requesting that such driers be erected in

their respective areas. This, I feel, is the beginning of the adoption of a new attitude by the New Irlander to his copra.

Many of the present producers can remember when copra was £5 per ton. To-day he will receive for the lowest grade £59 per ton and for the highest quality copra he can produce, £62 10s. per ton. A difference of only £3 10s. exists between the price per ton for the poorest and best copra produced. There appears to be little incentive for the producer who, at this stage, is not interested in earning additional income, to improve his standard of copra. Copra rejections to-day are principally due to the forwarding of under-dried copra.

Firstly, let us consider the methods of drying in use. We have sun, smoke and hot-air drying. The first two methods have many points in favour of their use in preference to the third, in the eyes of the Native.

The sun drying method, which may vary from the splitting of the nuts and leaving them face upwards in the sun, to the erection with bush materials of simple stands with moveable roofs, is very attractive to the small holder because of the little erection work and the almost nil financial outlay. Another practice very common along the West Coast of New Ireland is the erection of stands attached to a villager's house carrying moveable trays which are pushed under the house for protection during rains and at night. Sun drying is a precarious method of drying. Constant supervision over an extended period (one week and longer), is necessary in doubtful weather and is one which is not suited to this Territory all the year round. In the sun drying Society areas in New Ireland the profits made in the dry season are only paying for the re-conditioning during the "wet". Even during the dry season a good product cannot be guaranteed due to the location of the driers in close proximity to the beach. Constant supervision during the day cannot prevent the damage that can be done to partially dried copra by the cold salt-moisture-laden winds at night. On the other hand many small holders are content to use the sun drying during the dry season with the result that they are without a suitable drier on the approach of the "wet". They then

proceed to hurriedly erect an inferior type of smoke drier to carry them over the remaining wet months. The building of such emergency driers does not lend itself to improvement in design.

The average smoke drier which is in use is easily erected and is made from bush materials with the result that little cash outlay is required. The main construction faults in these driers are—

- (a) Drying chamber is unable to hold the heat;
- (b) Poorly regulated ventilation; and
- (c) The bed is too close to the fires.

The drying time, dependent on the method of firing and type of fuel may take from four days to two weeks. In my district the time is usually one week, this period being extended during the wet season, due to wet fuel, which results in a heavily smoked and stewed product. Even with good fuel and constant attention it is extremely difficult to produce good copra from the average present-day Native smoke driers. It would appear that where the method of drying requires a lengthy period, the small holder becomes lazy and careless and in the case of smoke drying this results in intermittent firing. Intermittent firing is often responsible for discolouration, decomposition by bacterial action and the growth of mould and only at the best of times be any but an inferior product.

The third method, Hot-Air Drying, is now to be considered. Previously it was mentioned that while our ultimate aim was to improve the quality of the small holder's product, our first problem to meet was the obtaining of a well dried product. As quality is largely dependent on the moisture content I feel that we can reach our goal quickest by the introduction of hot-air driers. Where the drying extends over a period from 30 to 40 hours there is a greater chance of the small holder giving continuous supervision to firing, than over an extended period as in smoke drying. With the erection of small hot-air driers, new and strange methods of construction must be used, and this, coupled with a financial outlay, makes the producer reluctant to change from his long adopted methods used in sun and smoke drying.

As the copra grade prices provide little incentive for the producer to change from smoke to hot-air drying we can only meet this reluctance half-way by the introduction of driers which are—

- (a) Of simple design and which utilize materials easily available; and
- (b) Of low financial cost.

I will not go into the construction details of a suitable drier except to mention the two basic elements as above. It is essential that the design be such that it can be erected by any villager. Also, as the Native does not appreciate a long, drawn-out work period programme, simplicity will enable the job to be done quickly.

A producer who may need a drier is usually reluctant in paying out money for materials, so cheap erection costs are often the deciding factor as to whether a hot-air drier will be built. Advantage can be taken in most areas of war salvage materials. The hot-air driers, which we are erecting in New Ireland (capacity 6 bags of green copra—drying time 36 hours) are being built for £23 5s. Utmost use is made of bush materials and war salvage materials. The £23 5s. buys the necessary European materials, i.e., 44 gallon drums for the flues, flat iron for the making of the chimney and cold inlet pipes and the copra wire. This is extremely cheap, yet many producers are not willing to make the financial outlay.

In some villages where these driers have been erected they are being worked communally. Where this happens every producer, after drying his copra, must throw into the fund a nominal fee per dried bag. The money is being held in trust to buy European materials for a permanent drier at a later date. This idea was germinated by the villagers themselves and, while it may have its complications, it shows a new attitude to hot-air driers.

The present-day Native hot-air driers, while giving a dry product, supply a very variable crop copra. The major faults are—

- (a) The bed is too close to the flue pipes which results in heavy charring; and
- (b) Poor ventilation which may also produce charred and discoloured copra.

After the erection of a suitable hot-air drier we must now combat the faults in harvesting and preparing the nuts for drying. Bad harvesting and preparation of the kernel may result in an unacceptable product. As this is not a technical paper on copra I will only mention the most common faults we see in the field.

1. *The Utilizing of Immature Nuts.*—

This will give copra of thin, leathery qualities of lower oil content. It can be picked out by examining the outer surface which has a shrunk and wrinkled appearance. While this copra is acceptable for the market it has been noticed that it requires a longer drying time and if bagged with other copra of the same batch it may develop moulds and contaminate the whole batch. This copra must not be mistaken for copra which has been made from nuts which have fallen prematurely, or as classified "dry" season nuts.

2. *The Utilizing of Germinated or Split Nuts.*—

Copra from germinated nuts is often rich in oil, but has developed a high free fatty acid content which is not popular with the buyers. Split nuts result in bacterial action which causes discolouration and decomposition. Also a red stain which is readily transferable to other unstained copra when bagged may result from copra which has been made from split nuts.

3. *Heavy Fragmentation of the Kernel.*—

With hot-air drying the usual way to cut the kernel is by the finger cut method. This is the partial division of the meat to be removed in the one piece. Inexperienced cutters will have a tendency to completely divide the meat thus removing it in small pieces.

Numerous small pieces result in a larger surface of the copra meat to be exposed thus enlarging the possibilities of infection. This is usually the point brought up by the people who are adverse to hot-air drying and who favour the Ceylon method of drying where the kernel is cut in the half-nut. The answer to this is that fingercut copra provides for quicker and better drying and is more suited as regards space for the average small holder's drier. In addition, less labour and attention is required;

whereas the labour quantity does not particularly interest us the attention factor does.

4. *Careless Cutting.*—

Little care is taken by the small holder when splitting his nuts and the factor which is most noticeable is the presence of foreign matter, notably sand. The nut, on breaking, should not be completely severed. If so, the axe throws up sand or ground which readily adheres to the set sticky surfaces of the copra. This stays with the copra right throughout the drying period and may result, if in high percentage, in rejection.

Once the copra meat has been cut it should be placed as soon as possible into the drier. The quick sealing of the face of the meat will determine the quality of the finished product. The small holder invariably places the meat into a cold drier, even after being warned. Slow sealing results in a brown discoloured surface which is quite different from the discolouration caused from scorching.

Slow sealing allows for decomposition which results in discolouration, pitting, etc.

Good operating or attention to firing is of paramount importance in the production of a good quality product. Intermittent firing in the present-day smoke drier is responsible, in the majority of cases, of the under-dried and inferior copra which is being presented to-day. An improved hot-air drier is also useless without adequate firing and until the producer adopts another attitude towards labour, giving continuous work in place of spasmodic work, poor operating will be one of our biggest problems. The rectification of this problem is entirely in the hands of the small holder.

On the removal of hot copra from the drier we immediately meet another major problem in Native copra production. This is poor and inadequate storage. Where the storage space is limited we find the small holder bagging the copra hot, which results in the copra sweating. On the erecting of a hot-air drier a small cooling and storage shed should be erected in close proximity. It is best to erect the complete drying unit at the one time as it is extremely difficult to have the storage shed erected at a later date as the Native producer does not con-

sider it of much importance. The small producer is quite content to bag the copra hot and store it in or under his house.

When erecting a storage shed two features must be considered, location and type of building. Where Native materials are used in construction it should be well situated away from the beach front to avoid the collection of moisture from the salt spray. Where Native settlements and groves are situated along the beach front as in New Ireland this is often difficult to avoid. The site chosen should not be over low-lying ground or in close proximity to damp areas such as sago swamps. In one area on the West Coast copra was being received which was heavily red-stained. On investigation it was seen that copra, well dried, on removal from the drier, was becoming stained after a month's storage. On the removal of the storage shed from the edge of a sago swamp to a dry area the red stain disappeared.

Size of the building is, of course, dependant on the production. However, it should be large enough to act as a cooling shed as well as a drying shed. On the removal of hot copra from the drier it should be spread not heaped on the floor of the building to cool. An authoritative opinion states that copra should be left four to five days before bagging. Where we are working with Native material buildings which are situated in many cases in close proximity to the sea it would appear that two days is sufficient, otherwise too much moisture is collected by the copra.

The building should be raised from the ground and well ventilated. If in some districts Native finances are sufficient to erect a storage shed with galvanized roofing, walls and a concrete floor, an important feature to bear in mind is never to lay the bags in direct contact with the concrete. This causes the lower bags to sweat and the cement in the concrete appears to have a burning action. This results in the copra becoming rotten and putrid, and will affect other copra in the building. This can be overcome by stacking the lower bags on split coconut logs or some such material.

Good quality copra is reliant on many factors and storage is another factor which may determine whether the product is

acceptable or not. Good storage conditions must be stressed as much of the Native copra is dependent on water transport for collection. Shipping is not always reliable in the Territory due to uncontrollable circumstances and copra may have to be stored for as long as six months in the Native villages. This now brings us on to water transportation where primitive transport and methods of loading present a problem, the remedy for which is difficult to see. Firstly, we have the transportation from village to village to a point of concentration. During transit rough seas, leaky canoes and careless handling result in many bags arriving wet. This wet copra is very seldom dried out by the Natives prior to storage, thus we have copra which will deteriorate quickly and adversely affect other copra of good quality in the small storage shed. Such copra under poor storage conditions becomes rancid and mouldy and readily attractive to insects. Upon the entry of insects into the storage shed other well dried copra is in danger and the foreign matter created by their activity can result in rejections. On the loading into the bigger ships, which are usually loaded by surf boat at the concentration points, the same problems exist.

We have now noted the common faults made by the small holder. The correction of these faults in some instances is not directly in our hands, e.g., water transport problems due to outside circumstances. However, other problems such as the prevention of under-dried copra and the improvement of quality is further complicated by the method of purchasing. As the majority of Native copra is purchased and marketed through the Co-operative organization we must now note the complications which arise through the *Modus Operandi* of such an organization. The focal point is the buying centre; here we have a Native clerk trained in book work only who is responsible for the purchasing of a Society's copra. He knows little about the product he is purchasing, being chosen only for his academic qualifications. While this matters little with the purchasing of a green product it becomes of paramount importance when dealing with a finished product. Where copra is purchased in small quantities, e.g., by the basket, we find various grades under-dried copra and dried copra being bagged

together under one shipment number. It needs very little under-dried copra to cause the rejection of the whole consignment. Our problem arises from the Native attitude which this method of purchasing creates. A producer who is marketing an inferior and often under-dried product is having it accepted by the Society's clerk and is receiving the same payment as another producer who is selling a better and well dried product.

This problem we must accept as the Buying Clerk is usually just another villager who will be influenced by the "pull of the village", thus is under an obligation to purchase all copra which is brought forward.

Our only solution to this, I feel, is the standardization of driers through a Society area. If there are no influencing circumstances such as we saw in the Nalik to cause the swing over to hot-air drying, patience, good talking and hard work are the only weapons an Extension Officer can use to promote new techniques into a Native society. With the introduction of a demonstration drier to an area be on the job yourself. On completion, test the drier and personally supervise the firing. The dried product, provided the drier design is all right, should be of F.M.S. or Hot-Air standard. If possible forward to the Copra Marketing Board, this copra with a few of the Natives concerned with the drier. When they see the copra accepted as marked they will have something to talk about on the return to their village especially if rejection at an earlier date has been high. By doing this you have proved to the villagers that the drier is capable of producing a good product if properly worked. Any future unacceptable or low grade product will be entirely their own fault. This may help to develop a sense of pride in their workmanship.

Do not think that the erection of a demonstration hot-air drier in an area will result in other drier construction.

The average Territorial small holder does not learn from observation because he has never been forced by necessity; he learns only by being told what to do and how to do it. For the further continuation of future erection of driers on improved lines

in an area it is necessary to organize the labour, do the ground work and, at a later date, return to check on the work. For the first few months that the driers have been in operation it is advisable to make casual revisits to the area just to check on operations. In Society areas in the Kavieng Sub-District, where hot-air driers have been constructed in every village, each village has been given a number which is marked on the bags under the Society number. This enables one to keep a check on the copra of respective villages when it is not possible to make a visit to the area. Casual enquiries and inspection of driers by patrolling officers of other departments helps considerably in holding the Native's interest in his work.

Coconuts are the oldest established permanent cash crop of the Territorial Native. We to-day are still facing problems which existed pre-war, we are still seeing the majority of the Native produced copra accepted as the lowest grade copra marketed in the Territory. We are still experimenting to find a suitable drier to introduce to the small holder. At this stage we can supply one but the question is will it be accepted in the majority of cases—no.

To quote—"While production is not up to maximum potential, nor the quality is as desired, a level has been reached where the Native producers' additional cash requirements are balanced against his unwillingness to make further efforts".

To date the progress in the improvement of Native copra has been slow; progress must be accelerated. As a material incentive to improve is absent we must create a psychological incentive. This can be done by increased publicity and visual education. In the old Society of Native peoples of any area prestige and price was dependent on personal ability. In some areas people were renowned for their hunting ability, others for their fighting or gardening ability. To-day this sense of pride is waning and the effect is being seen in the daily work. This pride must be rejuvenated.

As the Native is essentially of an envious or jealous nature the rejuvenation of this pride should be possible. The showing of movie films of Tolais erecting hot-air driers to a New Ireland community would help

to stimulate the activity in hot-air drier construction in New Ireland. Films of drier construction in New Ireland will stimulate the erection of hot-air driers, for example, in the Bougainville District.

We need only one Native in a strange village audience to think that he is missing out on something if he does not erect a hot-air drier, to start the erection of improved drying facilities off in a new area.

This is, I feel, the approach we must make but the facilities are not available. In conclusion, I wish to repeat that until there is an urgent need in the Native economy for a steady cash income, ignorance, poor management, lack of interest and absence of continuous application will always be present and be our foremost problem to be met.