PAPER No. 291.

Dr. A. G. ASGHAR, Ch. MOHD SHAFFI SANDHU—
Consolidation of Reclamation Operations.

Dr. A. G. Asghar :—The introduction of the paper gives the object for taking up experiment on the subject. It was realized that although actual reclamation of deteriorated lands in this province was started about 10 years ago yet the results achieved were not of the order as expected. The absence of complete data regarding the area reclaimed and water-supply used was felt after partition. The water-supply being rather limited at our disposal we could not afford to allow misuse of reclamation supplies. It was also realized that one and the same area was being reclaimed year after year. The position was discussed in various meetings of the Land Reclamation Board and on the proposal of Chief Engineer, K. B. Sh : M. A. Hamid, an experiment was undertaken in Lower Chenab Canal West Circle for the study of the following points :—

(1) The water-supply being limited at our disposal the reclamation operations should start from one and of a water channel and be progressively taken down towards the tail.

(2) There should be not possibility of giving reclamation supply to the same area, over and over again.

(3) As the entire reclamation supply available on a channel will be concentrated within small reaches a corresponding reduction in the expenditure would be effected.

(4) From the experience gained the time period for reclamation of deteriorated land could be calculated for various channels.

The paper describes in detail the various stages of a reclamation scheme on Khai Disty in Lower Chenab Canal West Circle. It gives under separate headings, reclamation scheme, alteration forms, warabandi and progress during three years of experiment, 1948-49 to 1950-51. The results obtained on this distributary have been compared with the progress on the two other distributaries Saringwala and Akil, representing more or less, similar percentage of thur but under different water-table conditions. A reference to Table IX would show that the proposed method of consolidation of reclamation areas is likely to give better results. There have been some difficulties in water-supply during the first year of experiment which improved in the following years specially in the case of Khai Distributary. Some important conclusions have been drawn from this study which are given on page 76.

I would like to make a few remarks on the limitations of the method instead of going into details of the conclusions arrived at. The thur percentage is the deciding figure of successful reclamation. If thur percentage exceeds 20% of C. C. A. of any reclamation outlet, the discharge required for reclamation purposes may exceed the convenient figure

from the engineering point of view. However, a bifurcation of water-courses under such circumstances gives the solution.

Thur percentage of a high order would result in bringing under reclamation an area of individual holding to such an extent that an ordinary cultivator may not be able to operate it.

The needs ol the zamindars is another important factor. He would like to have different kharif crops and may not take up only rice cultivation in tracts where rice is not the major crop. It has been felt that although 4 acres in a square can be easily taken under reclamation the figure can be raised to 6 under special circumstances and with special efforts on the part of the Government as well as zamindars. More than this a cultivator cannot do Any area where rice is the major crop the figure of 6 acres can be increased to even 12.5 acres per square as the zamindars cannot grow any other crop on his land.

In areas of very high percentage of thur it would not be possible to take up cent percent area and the scheme would have to be sub-divided into two or three reclamation cycles. It would, therefore, be a realized that reclamation supplies made available for a pretty long period within the head reaches would affect adversely the zamindars of lower reaches. There are instances where it would take centuries for reclaiming the whole of the thur area. However, these are special cases.

It is also visualized that if a number of reclamation cycles are fixed in the same reach, new area may become thur in the upper reaches during the period the lower reaches are taken up for reclamation.

In the suggestions made on page 77, an important point has been discussed regarding the retrenchment of reclamation staff. It has been calculated in the form of a table giving various percentages of thur, the reclamation discharge which can be put under one reclamation patwari. It would be necessary that for 10-25% of thur on C. C. A., the reclamation discharge may be 5-11 Cs. per patwari. The existing rules and regulations assign 5 Cs. discharge for one patwari which may not be practicable in areas where thur percentage is between 4-10. It is, therefore, obvious that discharge should not be the deciding factor for the halqa of a patwari and that instead it should be C. C. A. It is proposed that halqa of a patwari should be 2500 acres of C. C. A. compared to 5,000 acres of revenue patwari because a reclamation patwari is to inspect his halqa twice a week. It is the work which a patwari is likely to do which should determine his jurisdiction and not the reclamation discharge. Based on the percentage of thur on various channels, reduction in staff can only be affected in the case of 25.5% channels. The present procedure of not giving water-supply to high water-table area is net appreciated. Keeping in view the importance of centrally placed areas which have high water-table it is necessary that reclamation supply should be made available for areas having water-table within 3-6'. It may be pointed out that under high water-table conditions reclamation is easier and faster. The only important factor which must be looked after is that a proper crop rotation should be suggested to the cultivators which would keep the salts depressed. There is little possibility of taking

away the salts from soil profile for good and the only remedy can be to keep our land in a condition to give average yield under controlled conditions.

The high rate of devastation of culturable land in high water-table area, due to the presence of salts is another reason why preference should be given to these tracts. I would make a request to Mr. Hamid, the Chief Engineer incharge to give his opinion on this point.

It may be possible to convert perennial channels to non-perennial ones which may help to some extent to decrease the accretion to sub-soil water reservoir. The rabi crops under these conditions can be grown in wadh wattar, but it cannot help reclamation of saline soils.

It is high time to realize that without legislation the cropping schemes cannot be levied on cultivators. Other countries in the world have got control on the types of crops which the zamindars should grow. There should be a scientific look after by the Government if the zamindars of this province are not scientifically trained.

Mr. M. Masud Akhtar :—On the consideration of the utility and application of experiment described in this paper, to the thur problem in our country, there are some points which, in my opinion. need careful attention.

Whether the reclamation of salt impregnated canal irrigated lands by water application and leaching treatment, is proving of permanent nature. There are some cases where the reclaimed lands by this method have again deteriorated. The salts collected on the surface can, no doubt be taken down to a depth safe for cropping but they are always within capillary attraction and are liable to rise to the surface again and damage the land. It is thus doubtful if the present leaching treatment provides any commendable method for reclamation operations.

As pointed out by Mr. President, in his presidential address, there are more than two million acres of irrigated land which have been seriously affected with salt accummulation. Keeping in view the magnitude of the problem confronting us, it is very doubtful, if sufficient surplus canal water is available to tackle the problem by method of leaching. About 2500 Cusecs of canal water is being annually spared in the Punjab for this purpose and comparing this quantity with the total minimum requirements of 7000 cusecs, it is any thing but adequate.

One of the vital factor is the rate at which adoption of excessive water application to the fields can cure the deteriorated land.

Salt affected land recorded in 1944-45 covered 2.08 million acres and in 1945-46 covered 2.28 million acres i. e., an increase of 2 lacs of acres in one year. According to the information supplied through the paper only 1¼ lacs have been declared reclaimed during last 10 years and that too is uncertain.

This means that the rate of detarioration in a one year is more than the rate of recovery in ten years. This should obviously leads us to think about

some other quicker methods of curing the thur land and if this is not possible we must divert our immediate attention to ways and means of checking the deterioration. Our operations must be first directed to this direction. It is commonly acknowledged that the appearance o! salt on the surface is, amongst other things, directly connected with the rise in the water table. So this rise must be first arrested. This can be achieved through good drainage and installations of Tube Wells. I personally think that according to the environments of our country and due to high percentage of clay in its sub soil, the former solution is much more sound than the latter.

It is feared that the process of leaching of lands would accentuate water logging problem. It is true that the leaching in the high water table areas is being avoided, but its practice in low water table canal irrigated areas is a step towards the potential danger of SEM.

As is clearly borne out from the experiment the reclamation by additional canal supply is greatly handicapped in its practical application due to ever existing attraction for utilizing it for the growing of the cash crops on good land. This factor alone, in my opinion, can go a long way in making any large scale effort in this direction, a failure.

The last point to be considered is that the problem of thur is not uncommon in most of the canal irrigated lands in the world, specially in those located in torrid climate with low rainfall and low land gradients. We might learn from the system adopted to encounter this problem at places whose climate, soil and subsoil conditions are closely comparable to Pakistan.

Imperial valley irrigation districts of Calafornia and Nile Delta in Egypt have many things in common with the Indus valley. No where are the surface saline minerals leached down, without efficient devices to drain them off.

Any irrigated lands with bad drainage are considered to form an ill-conceived irrigation project. I, therefore, venture to suggest that our reclamation operations must first consist of big main and small fields drains, so as to ensure that no leached salts remain undrained in the sub-soil and also sufficient water is drained down through the soil profile so as to maintain a favourable salt balance. May I, therefore, add that we have, probably, started from the wrong end, in dealing with the reclamation operations.

Mr. S. A. Majid :—The general impression all over is that no progress has been made in reclaiming the thur lands If we pursue the gradual evolution of the reclamation operations it will be clear that the first experiment on reclamation in the field started on Chakanwali Farm. As soon as success was achieved it was felt that an experiment is necessary to determine whether this process adopted on the Government Farm could be practicable with the zamindars and consequently various big zamindars who showed any inclination to take up this experiment, supply was made available to them and this also proved it

utility all over. The scope of this was further increased keeping in view the availability of supply in the channels and it was found that the demand from the zamindars is more than can be met with from our resources. This necessitated further exploitation and it was concluded that supply must be increased from our subsoil reservoir and tubewell scheme was worked out which unfortunately has not progressed as anticipated due to various causes. Another difficulty also came in. The public was keen to seek what reclamation has been done by the Department and the scattered patches which have been reclaimed do not make any impression on the public mind if any thing satisfactory has been done. Consequently on experimental basis one channel was taken up completely from head to tail and all thur affected area was brought under cultivation. The house will give its view as to what is its opinion if the results as given below are brought to notice : --

82 % of the area under reclamation was reclaimed and the other 18 % was left out which was due to either high lands or some other causes and I feel the achievement is really very great.

Various delegations from all over the world have come and discussed the reclamation process in hand in the Punjab. They have agreed and praised the operations taken up by the Punjab Government and there has been no case where they have suggested anything better and this is no mean achievement itself. It is therefore evident that the department has found out the solution and it is to be operated. The operation can only be brought in if some sort of legislation is introduced. A bill under the name of reclamation authority is being put up to the Government with wide powers of acquisition of lands under thur and take up the reclamation work and return the land to the owners later after reclamation. Lately the Chief Conservator of forests has indicated that the rotational programme of afforestation will also be helpful in reclaiming our lands. Thus some sort of legislative provision should also be made in the reclamation bill that a particular area on a canal must carry out crop rotational programme so as to improve and quicken the reclamation operations. I quite agree with the views of the Chief Conservator of Forests specially from the day I am told by Dr. Asghar that in Holand the subsoil water level is controlled in such a way that instead of applying water from the surface they raise the water level of the subsoil and lower the water level of the sub soil according to the requirement. I personally give my frank opinion and congratulate Dr. Asghar on his good work and earning a good name for the Department, and I hope all those who are in touch with the reclamation work will continue to do their best ond help the country in this respect.

Dr. A. G. Asghar :—I have been asked to explain a question which has been asked from this Department from time to time—viz. Permanency of Reclamation operations. Experiments conducted in Irrigation Research (Land Reclamation) specially after partition, leave no doubt that there is every possibility of salts coming out

from the depths, which are not known yet. My own experiments show that salts rise even from 21·5′ depth We have made observations in lysimeter experiments.

All the figures supplied are based on the thur girdawari which was conducted in specified tracts from year to year but the girdawari of whole province has never been done. This will be the first year in which this full girdawari will be done and correct figures obtained.

There is a wrong impression given to the public that there has been an increase of 2 lacs acres of thur per year. Actually the progress of reclamation operations compared to preparation period is better.

18,000 acres had been reclaimed pre-partition.

22,000 acres have been reclaimed after partition. (This is average per year.)

Rise of water table has nothing to do with the appearance of salts because salts have appeared in those places also where water is say 15′. The factors are—fall in temperature, high rate of evaporation and slow rise of salts due to moisture movement under unsaturared conditions.

There is always a tendency among zamindars to grow cotton, sugarcane and other cash crops and there is the misuse of water.

American Military Mission Staff was shown the chemical analysis of the Punjab soils. They said that the Punjab soils were quite different.

We cannot expect the same movement of moisture over here as in California soils

We must have drainage system. No reclamation can go without drainage system. There is no possibility of taking out the salts. We can only keep them depressed.

Mr. Majid has said that reclamation started from Chakanwali. I differ from him. Reclamation started in Irrigation Research Institute. There is a set of papers dealing with base exchange, calcium and sodium salts. Based on them we started some field experiments in Chakanwali.