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FLOODING OF SALT LAND

By C. V. MALCOLM, B.Sc. (Agric.), Soils Division

Many farmers have expressed concern and some have gone to considerable expense in trying to alleviate flooding problems on salt affected land. Some consideration will be given here to flooding, its causes, effects on salt encroachment, methods of prevention and alleviation.

WHAT DOES FLOODING DO?

1. Salt and Soil Movement.

It has often been suggested that flood water carries salt and salty soil from one area to another and thereby causes salt problems on previously unaffected country. A careful consideration of the facts gives little support to this theory. Sampling in the wheatbelt on a number of occasions during winter has indicated that flood waters generally contain an insignificant amount of salt. Any soil which is carried by flood waters has always been thoroughly washed of any dissolved salts during transport. Some salty soils however, have a very poor structure and if deposited in a thin layer on the surface of unaffected soil may give a plant establishment problem and aggravate salting. In practice, the movement of soil by flood is usually from fresh to salty areas and contamination is unlikely to occur.

2. Water Table.

Does floodwater cause a rise in the water table? Groundwater investigations carried out in the past few years by officers of the Department of Agriculture have indicated that most wheatbelt valleys where salt problems occur are underlain at shallow depth by a water table containing more salt than sea water. This is supported by the experience of farmers searching for water or sinking dams. Moreover, this salty water is actually under pressure and rises towards the surface when holes penetrate the

Floodwaters which take more than a few days to disperse aggravate salt problems
Roads sometimes restrict flow, usually for a short period only. A low land gradient and the road caused this temporary lake to form.

water-bearing layer. The movement of water in the soil in these valleys is therefore towards the surface from the deeper layers.

*It is most unlikely that surface waters could contribute to such a water table. The water table is fed by underground water movement from higher ground.*

3. **Plant Growth.**

The effects of flooding on plant growth are obvious in wet seasons. Areas which remain under water for periods of more than a few days are often unproductive and remain bare during the subsequent summer. Any factors which cause potentially salty soils to be bare during the late winter and spring months provide ideal conditions for the accumulation of salt at the soil surface and hence the development of a salt problem. This means that wherever flooding causes decreased growth on potentially or actually salty soils it aggravates the salt problem. The removal of top soil by floodwaters is obviously also detrimental.

**WHAT CAN BE DONE TO ALLEVIATE FLOODING?**

1. **Catchment Area.**

Flood waters are usually the result of run-off from sloping country; the contribution from flat land is usually negligible. It is therefore highly important to pursue methods of agriculture which will retain and use the rainfall where it falls. The most effective means of holding rainfall is to maintain a vigorous plant growth on the soil; this will in turn keep the soil in good condition for water penetration. Where slopes are excessive soil conservation methods involving contour cultivation and contour and grade banks should be employed.

These measures are far more important than those which can be used in flat country. Not only is production on the hillside as well as on the flat improved, but use is made of water which, otherwise, constitutes a menace.

2. **Flat Country.**

Many reports are received of farmers having large acreages of low-lying land covered with shallow sheets of water. In many cases this water takes more than a few days to dissipate and therefore aggravates any salt problems which may exist. A number of farmers have gone to considerable expense to drain it from their land. These efforts must be considered in the light of the value of the increased production likely to accrue. In general, it is difficult to drain these sheets of shallow water because of the lack of the fall in the paddock itself and from the paddock to the point of disposal for the water. Usually the best approach is to try to remove the water by broad shallow drains up to eight inches deep, which follow the lowest levels in the paddocks concerned. Low banks may also be used to confine water which, otherwise, would spread from channels across flat paddocks.
Drains suitable for removing shallow sheets of water may be made as above. Water can flow into these from both sides.

The greatest limiting factors in efforts to clear water from salt land are having sufficient fall to give flow and having somewhere to dispose of the water safely. Care must be taken not to cause water hazards on adjacent property as this may lead to legal action.

The usefulness of drainage in dealing with salt problems is restricted to the control of surface water. It is not possible to economically construct drains which have any effect on a water table 3 ft. or more beneath the surface.

CO-OPERATIVE EFFORT

Flooding problems often are common to a number of farms in one catchment area. Some farms may be sources of flood water while others are traversed by flood waters which do not arise within their boundaries. This is an opportunity for co-operative effort for mutual benefit. Soil conservation practices employed on the water source properties will increase production on these, at the same time alleviating flooding in properties downstream on the flat. Co-operation may involve the planning of systems for the control of flood waters. Such co-operative effort will obviate the likelihood of one farmer's work being spoilt by another farmer's neglect.

ROADS

Complaints are received from farmers who consider roads are aggravating their salt problem by restricting flow of flood waters. As has been explained, flood waters which dissipate within a few days do not cause serious damage on salt land. Once again co-operation is called for. Road Boards and the Main Roads Department have an unenviable task in maintaining roads across salt affected country, especially in areas where poor farming results in large amounts of run-off from adjacent farms and where clearing new land in the district results in an overall increase in run-off since road foundations were placed. The need for tolerance and a broad approach to the overall problem of making the most of our limited rainfall is obvious. The door is open for co-operative effort, in this case between farmers, road authorities, and Soil Conservation Officers of the Department of Agriculture.
IN BRIEF

• Flooding may aggravate salt problems in flat valleys in the wheatbelt. The most important preventive measures concern retention and use of the rainfall on the hillsides where it falls.
• Measures aimed at controlling flood water on flat country are of some use. In general, the problem of flood control must be viewed from the point of view of the whole catchment and involves co-operative effort on the part of farmers and civic authorities.
• Farmers worried by flooding are urged to contact the Department of Agriculture, the road authorities and their neighbours in a spirit of co-operation and with a willingness to do all in their power to tackle their share of the problem.

SALT LAND DEMONSTRATIONS WORTH SEEING

The Soil Research Section of the W.A.D.A. has in the last few years established trial plantings of salt tolerant plants on a number of properties throughout the wheatbelt. These plantings all include bluebush, creeping saltbush and old man saltbush.

Some sites also have plantings of Puccinellia, a salt tolerant grass introduced to Western Australia from Turkey by the C.S.I.R.O. Farmers with saltland problems are recommended to inspect any of the plots listed below with the permission of the farmer concerned.

Coomberdale—Mr. R. Tonkin.
Koorda—Mr. G. Lodge.
Welbungin—Mr. E. Probert.

Bolgart—Mr. E. House.
Quairading—Mr. R. Lyall.
Bruce Rock—Mr. E. Endersee, Mr. R. Shields.
Narembeen—Mr. H. Cook.
Corrigin—Mr. J. Trott.
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