Teaching the Word – "Waterponding" and "Waterspreading" – Aus Aid style

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Abstract

A joint three year Australian Government Overseas Aid Program (Aus Aid) African training partnership between the University of New England, Armidale and Central West Catchment Management Authority, Nyngan saw 79 Aus Aid African trainees from 29 African countries trained in the waterponding and waterspreading rangeland rehabilitation techniques. Waterponding and waterspreading are land rehabilitation techniques that targets the variability of rainfall and runoff in semi-arid systems to initiate long term changes in ground cover. This paper brings the training method used to extend the knowledge to the trainees on the two rehabilitation techniques that can transform bare scalded landscape into a biodiverse native pasture.

Introduction

The global population is set to exceed nine billion by the year 2050 (U.S Census Bureau, 2011), one that will test the very fabric of the human existence, food (production). Globally natural resources including arable land are diminishing at rates greater than ever threatening the agricultural industry (FAO, n.d.). Therefore, innovation in the area of rangeland rehabilitation is vital and more notably the spreading of existing knowledge. This paper will highlight the teaching methods used in the intense hands on training provided, so that the Aus Aid African trainees could return to Africa and be able to carry out the survey and construction methods of both waterponding and waterspreading rangeland rehabilitation techniques in their own country.

Conventional land management practices in the semi arid rangelands of over-utilisation from grazing is the main cause for land degradation resulting in loss of soil organic matter decrease in soil fertility, diminution of soil organic carbon, increase in water and wind erosion (Mekuria *et al.*, 2007). This has resulted in the formation of clay pans once the fine sandy loam topsoil has been eroded away. Clay pans are surface crusts, which are typically 3mm in depth. These surface crusts are also called scalds. Water does not penetrate through the scalded soil surface. The clay pan swells when saturated, sealing cracks in the surface and preventing water infiltration; resulting in water erosion. Hence the loss of soil moisture in the landscape. This makes it really hard for seeds to get into the soil and germinate.

Waterspreading is a land management technique used to evenly spread and disperse rainwater flow over country with gentle slopes less than three percent. The driving mechanism behind the success of waterspreading is the reduction of the energy of water flow, meaning a large reduction in soil erosion and an increase in water infiltration. Waterspreading involves creating a series of small banks to direct water away from eroding drainage lines to areas where it would normally not flow. Each bank is designed to slow and spread water as it continues down slope, increasing infiltration as to better suit native grasses and herbage. Waterponding is a land rehabilitation technique used on duplex scalded soils in the semi-arid rangelands. Waterponding is the holding of water on the scald in surveyed horseshoe-shaped banks, each covering 0.4 ha. The ponded water leaches the soluble salts from the scalded surface. This improves the remaining soil structure, inducing surface cracking, better water penetration and entrapment of wind-blown seed. The teaching of these two rehabilitation methods to the trainees in three days is a challenge that can be done.

Methods

The 79 African trainees were from 29 different African countries so the language barrier was considered in preparing all training workshops. The theory in the class room was spoken in a much slower pace than usual. Visuals have no language or cultural barrier, therefore the use of photos to tell the story of the two rehabilitation techniques was a huge success. Waterponding and spreading has been practiced in the Central West Catchment since 1970's and is well documented. The slide presentations gave the trainees, a full history of how the two rehabilitation techniques came about and the sequence of the circle that each operation of the rehabilitation technique had to occur.

All the theory has to be backed up with actually doing the work in the field, so step back and start with the staff, level and tripod. How to set up and use the level. Both the waterponding and waterspreading require all the location points to be surveyed. Before the full day in the field with the road graders to construct the earthworks, a half day of practise surveying around old waterponds to understand the correct depth each waterpond has to be and how the ponds fit together to maximise the scald covered with water.

The full day in the field is the real thing. The trainees are taken to a scald that has lost over 30 centimetres of fine sandy loam topsoil. The trainees are then put into groups of no more than four individuals along with one staff, level and tripod. Each group will be required to layout at least five waterponds each. As each pond is surveyed ready for construction they are checked with the vehicle mounted laser system. A road grader is used for construction of the ponds, which each trainee is given the opportunity to get into the cab of the road grader with the driver and is shown how the ponds are built. Each waterpond is then seeded with saltbush seed and native grasses along the inside batter of the bank and across the middle of each waterpond. The trainees are taught on how to do monitoring of the site before the earth works starts and what information should be captured with the photo point and step point along with soil carbon testing of a controlled and rehabilitated sites.

Results

The intense theory and skills taught to the trainees were put to test in the field, with each trainee laying out the waterpond using the levels producing very impressive scald rehabilitation (refer to the before and after photos). Waterponding projects are now in full swing back in Sudan, North Africa using the skills the trainees learnt, with impressive rehabilitation results.

Discussion

A solid foundation in theory is well and truly important. The theory can be taught in class rooms, however to solve real world problems, one has to be able to apply the theory into practise. During the course of this program, the Aus Aid trainees have not only learnt the theory behind waterponding and waterspreading, but also put the skills they acquired to test so that they will be able to implement rangeland rehabilitation methods in their own country. The last three years of teaching the word on "waterponding" and "waterspreading" has produced satisfying outcomes for the rehabilitation methods. Let's hope these trainees pass down the knowledge they have attained to their fellow countrymen and women.

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