Final Report

Project objectives

The objective of the proposal was to quantify and collate farmers experiences in re grassing post 2004 storm event so after the next event farmers will be better prepared either in their response or due to their farm practises leading up to the event.

Slip Stabilisation: Flying seed onto slips was excluded from the Government recovery package because it was considered to be ineffective and uneconomic. Despite this some farmers chose to oversow slips. They believed that bare hill sides would continue to contribute to sediment flows into waterways and reduce the capital value of their farms. We received feedback from some farmers that oversowing was surprisingly successful. We wished to document and quantify the practises that achieved successful regrassing. We wanted to provide recommendations on slip prevention and regrassing slips. We wanted to compare revegetation of slips with no intervention. We also wished to determine the frequency of failure and the economic implications of regrassing slips. We will also described farmers experiences regarding their perception of the effectiveness of historical farm practise (e.g. tree planting etc) in preventing slips and their plans for slip prevention in the future.

Silt Regrassing: Farmers reported that achieving successful regrassing of silted paddocks was much more difficult than first anticipated. Results were highly variable with some successes and failures. In addition paddocks under-performing for much longer than expected. However the time period over which farmers could make claims was relatively short. Quantification of the effectiveness of the regrassing strategies and time taken to return to full production would provide farmers, consultants and government with essential, timely, information that would be very useful at the next flood event. After the February storm event there was an excessive delay in the distribution of what information was available to affected farmers. This was because previous experiences either had not been documented or were not readily accessible documents. Some farmers made rapid decisions that they later regretted as more information came to hand.

Approach

Slip stabilisation: In July 2005, using an appropriately designed questionnaire, 85 randomly selected farmers from slip affected areas were interviewed by phone. Farmers were asked questions on the impacts of previous farm practise on slip incidence, subsequent slip prevention plans. They will be asked to describe the remedial action they took for slip revegetation and their perception of the success or failure of their actions. They will also be questioned on their perception of slip damage on farm saleability and capital value and impact of previous farm practise on slips. Farmers were randomly selected using the Federated Farmers database compiled at the time of the storm event.

Massey students were employed to visit farmers identified willing to be part of additional measurement. Farmers were contacted and appointments arranged. The farmers were asked to identify 8 slips which are representative of their farm. The farmers took the student to the site of the slip and assisted the student with the collection of the data. Obtaining a GPS location of the monitored slips will allow future monitoring either on the ground or via aerial or satellite imagery. Students will be trained to assess slope angle and soil by direct observation and soil map information. The slip will be divided into scarp, mid slip and tailings and three quadrats, representative of the vegetation of that area of the slip will be selected. Equivalent quadrats will also be selected immediately adjacent to the sampling site on stable hill side The quadrats will be assessed by eye for botanical composition and then trimmed to 2 cm using hand shears

and photographed. Back in the laboratory one operator will assess all photographs for percentage ground cover using image analysis if possible or by visual scoring.. The database will be statistically tested to see if any farmer remedial action altered ground cover and species composition relative to doing nothing and the frequency of success. Both the numerical and verbal data will be analysed to determine key success factors. If significant improvement in revegetation was found then these sites may be monitored for an additional two years if the group manages to source funding.

On a subset of 5 farms from either a siltstone and mudstone parent material, the impact of slip revegetation on sediment flow off the slope following rain simulation will be recorded on one slip. In late winter when soil is water saturated, five quadrats will be selected over the range of ground cover found on the slip and the vegetation will be trimmed to 2 cm and photographed for ground cover assessment as above. Outside the quadrat, on the downward side, a trench will be dug and guttering with a lip that extends over the cut surface will be placed in the trench. A known volume of water contained in a watering can will be applied from 1 m above the soil of the quadrat and the run off will be collected. The run off water will be transported back to the laboratory, and weight of sediment contained in the water will be measured.

Revegetation of silt. In July 2005, 50 randomly selected farmers from the Federated farmers database with flooding (with ones already surveyed by Massey removed) will be identified and interviewed regarding their regrassing programme and its success and failures. A subset of these farmers will have both slips and flooding. Flooded farmers will have good records because they were required for reimbursement from Flood relief. Farmers will be asked if they are willing to have students visit their farms and assist them in making additional measurements. Measurements of soil profile, vegetative ground cover and species on silted and unsilted paddocks will be conducted. Methodology for ground cover assessment as described above for slips will be used. This methodology duplicates that used by Massey in their work to date.

Economic context: An attempt will be made to put the findings in an economic context for extension of farmers.

Collating the data: The existing technical information that was compiled in an earlier SFF project and the new information on farmer experiences will be compiled, with the assistance of farmers who experienced the flood event. The farmers will assist in ensuring the documents are appropriate and farmer friendly. Farmer contacts willing to talk to farmers in similar positions will be also included in the documentation. We will ensure (irrespective if we are successful with the tender) that this information is also merged with the information collected from the additional MAF Policy project.

What were the main findings from this project?

Slip Management

The objective of this study was to determine farmers' perceptions of the effectiveness of regrassing slips following the February 2004 storm event. Eighty one randomly selected farmers were surveyed and 444 slips had pasture composition and ground cover assessed on top scarp, mid-scarp and tailings and on adjacent stable hillside. Forty one percent of farmers regrassed slips, most flying on white clover+ryegrass seed using a helicopter. However, the farmers only mildly agreed that this method was effective at improving slip vegetation. Two years after the storm event, ground cover of regrassed tailings (96%) was similar to non regrassed tailings (93%) and no difference was found in botanical composition (clover 20% GM, dead 23% DM). In contrast, oversown scarps (top + mid) had 3% more clover, 6% less dead matter and 11% more ground cover than non oversown slips. The improvement in

ground cover was 20%, 11% and 0% for slip slopes of <30 o, 30-40o, >40 o respectively. The high cost method of oversowing slips used by most farmers, coupled with the small improvement in rate of revegetation, produced negative internal rates of return.

Silt Management

This paper takes farmer knowledge obtained after the Lower North Island floods of February 2004, along with measurements collected on 201 regrassed paddocks and develops a farmer decision tree for regrassing silts. Survey information was collected from 52 farmers from November 2004 to January 2005 (1Y), and from a further 49 farmers from January to May 2006 (Y2). When the flood waters receded, mostly after less than 5 days, 80% of pastures had been killed and average silt depth was 20 cm (0 to > 1m) comprised of ponded clay (20%), loamy (43%) or sandy (38%) silts. In comparison to clay silts, sandy silts were 31% and loamy silts 12% less productive over the 18 months after the flood. Deep silts were 32% less productive than shallow silts. When topsoil and silt had been mixed together pasture cover grade score was higher than when undisturbed (6.3 vs. 5.9, $P<0.002$). Ground cover score was lower on oversown (6.0) ($P<0.002$) pastures compared to direct drilled (6.3) or fully cultivated (6.1) pastures. A comprehensive decision tree for regrassing silts of varying depth and texture is presented including information of time to first grazing, expected productivity over time, sowing methods and expected ongoing issues.

What difference has this project made to your group/ community of interest/ industry?

In 2004 there were no clear guidelines on how to recover silt and slip damaged pasture. We now have information available on one CD and lodged on websites and with agencies such as Sustainable Farming Fund, MWNZ, Fonterra, Regional Councils, Ministry CDEM and Rural Support Trusts.

With an increasing number of storm events in the last few years the research and final collation of the results into farmer friendly documents and technical papers has meant a wide distribution of information to industry groups.