

# Healthy Catchments = Productive Catchments NLP Project Report Summary



## Community Engagement - Events:

### 1. Australian Stingless Bees – crop pollination and management

**Held:** Coffs Harbour 06/10/15

**Attendance:** 34

**Delivered by:** Dr Tim Heard and Dr Tobias Smith

**Summary:** Workshop covering the topics of bee nesting and foraging biology, diversity and importance of wild bees, stingless beekeeping around the world, using stingless bees for pollination of gardens and farms, sugarbag honey and its properties, and more. The event included a practical session where participants were able to open a hive and observe the structures within, followed by a demonstration of hive splitting and the process of colony propagation.



*Figure 1: Tim Heard discussing stingless bee hive splitting.*



Figure 2: Tim Heard demonstrating the hive splitting process.

## 2. Planting Trees – what to keep in mind and what to watch out for

**Held:** Central Bucca, 23/02/16

**Attendance:** 21

**Delivered by:** Craig Stehn, Ricky Crane, Lloyd Foster, Doug Binns (State Forests Ecologist), Pia Dollmann (Coffs Landcare)

**Summary:** Many of us enjoy tree planting most in all our landcare activity, but there are some situations where tree planting can be quite daunting:

- large areas,
- riverbanks that get flooded,
- areas of wildlife browsing,
- extreme climatic events and more.

This workshop will explore and demonstrate the entire process from site preparation to species selection and planting and will also discuss the use of tree guards and site maintenance. The planting site we will visit is very large with 1800 trees planted.

Craig Stehn will give an overview of his approach to revegetation through the Jaliigirr project and 'old hands' at tree planting Ricky Crane and Lloyd Foster give demonstrations and share their long years of experience.



Figure 3: Doug Binns (NSW Forestry Corporation Ecologist) discussing the role of woody weeds on this planting site.



Figure 4: Doug Binns and Lloyd Foster discussing plant selection.

### 3. Trees on Farms – how to use trees for production and biodiversity benefits

**Held:** Orara Valley Fair, 13/06/16

**Attendance:** 6 (for formal presentation) 100+ as visitors to the combined Coffs Landcare, Orara Valley Rivercare stall that had a focus on the uses of trees on farms (e.g. windbreaks, pasture and stock protection)

**Delivered by:** John Ross (Coffs Landcare)

N.B: This workshop had previously been planned to be delivered in May but a lack of RSVP's led to this event being postponed. The event was subsequently rescheduled to line up with the Orara Valley Fair and involved the delivery of a presentation on Trees on Farms and an all-day display on trees in productive landscapes.

**Summary:** Trees on farms provide many benefits for stock, wildlife, aesthetics and property value. This workshop will help you choose the right trees for your farm and examine the rules to follow to ensure the longevity of paddock trees, and maximise the benefits of windbreaks for your livestock and the economic and environmental sustainability of your farm.



Figure 5: Large crowds at the 2016 Orara Valley Fair.



Figure 6: Landholders discussing the windbreak design with Coffs Landcare staff.

#### 4. 20 Years of Rainforest Restoration

**Held:** Dorrigo, 14/06/16

**Attendance:** 22

**Delivered by:** Craig Stehn (Coffs Harbour City Council), Tim Scanlon (NPWS), Peter Abell (EnviTE – Green Army)

**Summary:** Over the last 20 years NPWS have undertaken extensive revegetation and regeneration works within three previously cleared paddocks along the northern edge of Dorrigo National Park. These sites contain one of the most extensive revegetation sites in the region, with over 16,000 trees planted at one site in 1996. Three different planting methods were trialled at this site; straight Acacia plantings at 2m x 2m spacings, mixed rainforest plantings at 2m x 2m spacings and dense mixed rainforest plantings at 1m x 1m spacings. During this workshop we will look at how these sites have developed over this 20-year period and discuss why some planting methods have worked better than others. We will then look at the other two regeneration sites where limited planting has taken place and discuss alternatives to broad scale plantings.



*Figure 7: Peter Abell (EnviTE - Green Army) discussing restoration approaches the team have been using at the Dome Rd site.*

## Post Workshop Surveys:

SurveyMonkey was trialled during this project as a way of evaluating the workshop events. Prior to this series of workshops, hardcopy evaluation handouts had been the main form of workshop surveys used. It was thought that there may be less bias in an online survey as there would be no perception of pressure to fill out a positive response in an anonymous online survey. Of the 83 workshop attendees 38 filled out the online survey. This response rate was slightly lower than the traditional workshop evaluation form. Overall responses were positive with 73% of respondents rating the workshops as excellent, 20% as very good, and 7% as fairly good. Although SurveyMonkey provided a fast way to create surveys and document responses, a more effective although also more expensive option may be to undertake limited phone surveys/interviews of a selection of participants.

### Examples of comments:

"I really enjoyed the whole day. The catering was excellent. The presenters were inspiring. The other participants were interesting. The only problem was that I have friends who were unable to attend and would have loved to have gone. Any chance of a repeat workshop? Thank you"

"all very practically relevant"

"The workshop answered all my questions without having to ask. Great job"

"An excellent workshop particularly for those with questions arising from their limited experience in working with native bees. The passion, knowledge and willingness to share ideas and information by both presenters was impressive. A follow up in say 12 to 18 months would be appreciated. Thanks to Landcare for obtaining some of the limited funding to conduct such a worthwhile course"

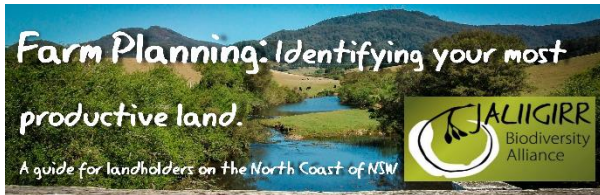
"I already have 3 native beehives. I feel more confident now in accessing my hives for splitting. I feel there is only so much you can learn from books. The hands on approach is much better for me. Thank you for giving me the opportunity to learn from someone with the amount of knowledge that Tim has"

"very informative and explained well to the participants on the day"

"Enjoyed the face-to-face catch up with others (who are in the region), sharing the same passion for native stingless bees. Also good to meet people with more knowledge about the beautiful creatures and demonstrated their skills towards the bees. Their enthusiasm is HIGHLY catchy. Really enjoyed it"

"well presented & well appreciated"

# Community Engagement - Publications:



## Why develop a farm plan?

There are parts of every property where the costs of maximising yield can exceed the long-term returns. It is useful to assess the potential of each part and consider how it might best contribute to the whole farm.

The potential of any particular section of land will depend on four main factors: **slope, aspect, soil and climate**. These factors will determine how much effort will be required to maintain grasses or plants less suited to the site.



Good farm planning will have production as well as biodiversity benefits.

A farm plan that works with the natural tendencies of the land will reduce weed control costs and erosion damage and allow you to focus limited financial resources where they will be of most benefit. Each land parcel can then contribute as it best can, and the whole will be more resilient to climatic extremes.

## Developing a basic farm plan

To start you will need an aerial photo of your property showing vegetation and farm infrastructure. For a small property of less than

40ha, an image from SIX Maps (<https://maps.six.nsw.gov.au/>) or Google Earth would be suitable. Save the image of your property to a thumb drive and have it printed to A3 size at a copy shop.

Larger properties may need to order a large image from the NSW Department of Lands (<http://www.lpi.nsw.gov.au/>) or request one from their local council.

Once you have an aerial image of your property, layers of clear plastic sheeting (e.g. Grafix Clearlay Acetate – available online) can be placed over the image so that you can start to mark out your plan with coloured white board pens. Mark your boundaries in black and watercourses in blue as this will help orientate the map.

## Slope and aspect

Traditionally, land has been classified on slope alone, but this is only part of the story.



A western facing slope in mid spring showing distinct bands of moisture.

In the picture above, there are three clear bands of moisture. Through repeated dry springs, the

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## Pollination and agriculture

Pollination is an essential reproductive process that helps maintain genetic diversity in plant populations, ensures the adequate production of seeds for reproduction, and stimulates the development of fruits to attract seed dispersers. The need to move pollen from flower to flower has also driven an extraordinary diversification in flower morphology and the co-evolution of numerous specialised animal pollinators.

Agricultural production is also highly dependent on pollination, and for the vast majority of species this means relying on animal pollinators. **Pollination by animals influences fruit set, size and quality for 39 of the 57 globally important commercial crop species, and within Australia the benefits of pollination services to agriculture are estimated to be between \$4 to \$6 billion per annum.**

## Bees... perfect pollinators!

Although birds, bats and other mammals are valuable pollinators, insects, and in particular bees, are our most highly evolved and important group of animal pollinators.



Other insects, such as the Honeybees, are also important pollinators of many crops and native plants.

While the ubiquitous European honeybee (*Apis mellifera*) is familiar to almost everyone, many people are unaware that there are more than 20,000 bee species globally, with Australia having approximately 2000 species.

## What are bees?

Bees are closely related to ants and wasps (Order: Hymenoptera) and are actually a type of specialised predatory wasp. **Whereas most predatory wasps prey on other insects, bees collect pollen and nectar to feed their larvae.**



An individual leafcutter bee brood cell, showing the pollen ball and egg. When the egg hatches, the larvae consume the pollen before pupating, and eventually emerging as an adult.

Bees also have branched hairs – although you are unlikely to see them without a powerful microscope. These densely packed branched hairs are "sticky" and help bees collect pollen.



A high magnification photo of the branched hairs common to all bees (Photo: Terry Houston - IMA Museum).

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## Why incorporate trees into your farm plan?

Private landholders and farmers are by far the largest group of land managers in the Northern Rivers region of New South Wales, managing in excess of 58% of the total land area. These freehold areas include our most productive lands, as well as areas of high biodiversity value, and maintaining this balance between production and biodiversity is essential if we are to sustain our environment into the future. In some areas agricultural expansion has led to farmland being over-cleared, and many landholders are now trying to restore their properties through rehabilitation and revegetation works.

Revegetation of cleared areas within these mixed agricultural landscapes has the opportunity to improve biodiversity values and increase on farm productivity. While the biodiversity values of native vegetation are easy to appreciate, there are often many production and economic benefits as well. These benefits are called ecosystem services and they can provide environmental and economic returns to both the landholder and the broader community. Areas of vegetation may provide the following ecosystem services on your farm:

- Stock shelter
- Pasture and crop protection
- Resilience to drought impacts
- Improved water quality
- Erosion management
- Beneficial insects (pollinators and natural pest control)
- Carbon sequestration
- Timber lots

## How to identify areas suitable for planting?

Before you undertake a revegetation project you should look at identifying the most productive areas of your farm – these areas are unlikely to be suitable for revegetation due to their high agricultural values (See Jaligirr Factsheet 'Farm Planning: Identifying your most productive land'). By classifying your land based on agricultural capabilities you will minimise your management costs while maximising yield, and you will focus your energy and resources where the best returns are.

Assessing the capabilities of your land will help you identify areas of low productivity land that may be better suited to revegetation. You are also likely to identify productive areas that may benefit from additional shade trees or shelter belts.



Established shelterbelt, providing protection to a large exposed paddock.

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## Case-study summary

This case-study documents and assesses rainforest restoration activities undertaken in an abandoned paddock adjacent to Dorrigo National Park over a 20-year period between 1996 and 2016. Restoration works occurred on three sites (REGEN 1, REGEN 2 and REGEN 3) totalling 17ha in area. This case-study will focus on revegetation activities in REGEN 1, and will assess restoration success, barriers to restoration and future directions.

## Dorrigo National Park Bush Regeneration Project

### Site history

Vegetation clearing has been widespread on the Dorrigo Plateau in northern New South Wales. The rainforest communities that once existed on the rich plateau basalts are now restricted to isolated gullies or areas not suitable for agriculture, and many of the remaining remnants are affected by grazing and weed invasion. Dorrigo National Park is the most significant remnant of this previous vegetation, and the park protects temperate rainforest and provides refuge for sub-tropical rainforest.

In 1975 the National Parks and Wildlife Service gained control of three abandoned paddocks along Dome Rd, adjacent to Dorrigo National Park. These paddocks had previously been leased out for grazing by the Dorrigo Park Community Trust to generate income for the upkeep of facilities in the park. The paddocks were mostly cleared, with only occasional remnant trees (*Acacia melanoxylon*, *Doryphora sassafras* and *Acmena smithii*). Pasture areas were dominated by kikuyu (*Penisetum clandestinum*) and small leaf privet (*Ligustrum sinense*) regrowth.

## Restoration goals

The original vegetation, and the target community for the restoration project, was sub-tropical rainforest dominated by *Sloanea woollii*, *Ascyrodermon actinophyllum*, *Ficus watkinsiana*, *Ondrocaryon exaltata*, *Orites exaltata* and *Planchonella australis* (Floyd 1990) STR1 Suballiance No. 7).

## Restoration activities

In early 1997 the largest site (REGEN 1 – 6ha) was cleared of small leaf privet (*Ligustrum sinense*), deep ripped, fenced and then planted with 17,500 tubestock (13,500 *Acacia melanoxylon*, 1,000 mixed rainforest species) through the Greening Australia Farm Forestry Project. A further 4,000 *A. melanoxylon* and 1,500 mixed rainforest species were planted in 1999 to cover seedling mortality.



Dorrigo National Park Bush Regeneration Project Sites: Left: REGEN 1, Right: REGEN 2 and 3 (Photo 1997).

In 2005, two additional sites (REGEN 2 and REGEN 3 – 6ha total) were cleared of small leaf privet. This work was followed up with an application (spray) of metsulfuron methyl (BrushOff™) in 2006 and 2007 to kill any remaining small leaf privet seedlings. Woody weeds under remnant trees were stem injected with 100% Glyphosate. In mid-2007 the site was fenced

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