Australian Government
Australian Centre for International Agricultural Research

Amendment to ACIAR Technical Report No. 84 and reader notes

The first version of ACIAR Technical Report 84, pages 42 & 43 (starting column 2, paragraph 2), stated that:

> Studies using chronosequences and paired land use approaches that conclude that acacia plantations acidify soil often overlook the confounding effect of differences between contrasting land types. For example, Dong et al (2014) compared fallow shrublands in central Vietnam, unavailable for forestry since 1995 following construction of overhead powerlines, with a chronosequence of adjacent acacia hybrid plantations from age 0.5 years to 5 years. Their results clearly show that the fallow land had several soil properties very different from the land under the acacia age series, which themselves seem to have had a varied history (some plots probably being under their second plantation rotation subsequent to 1995). For example, total SOC in the uppermost 20 cm of soil in the fallow land averaged 12.99 ± 1.75 (SE) Mg ha^{-1} and that in the plots of 6-month-old acacia was 21.76 ± 0.72 (SE) Mg ha^{-1}, some 40% higher. This large difference in SOC is clearly not attributable to 0.5 years of growth of a single acacia crop. Similar large and unexplained differences in a range of other soil properties (e.g. exchangeable Ca and Na) between fallow land and young acacia stands, not attributable to the growth of the young trees, were reported. Despite such critical confounding problems, and based on a very small difference of 0.1–0.2 units of pH, the study concluded that acacia plantations increased soil acidity.

The authors of the cited paper, Dong et al (2014), raised concerns about the accuracy and intent of this text.

> Dong TL, Doyle R, Beadle C, Corkrey R and Quat N (2014) 'Impact of short-rotation Acacia hybrid plantations on soil properties of degraded lands in Central Vietnam'. *Soil Research* 52(3): 271–281

Following a review in response to the concerns raised, the authors of ACIAR Technical Report 84 agreed to change the text on pages 42–43 to the following:

> Studies using chronosequences and paired land use approaches that conclude that acacia plantations acidify soil often overlook the confounding effect of differences between contrasting land types. For example, Dong et al (2012, 2014) compared fallow shrublands in central Vietnam, unavailable for forestry since 1995 following construction of overhead powerlines, with a chronosequence of adjacent acacia hybrid plantations from age 0.5 years to 5 years. Their results clearly show that the fallow land had several soil properties very different from the land under the acacia age series, which themselves seem to have had a varied history (some plots probably being under their second plantation rotation subsequent to 1995). For example, total SOC in the uppermost 20 cm of soil in the fallow land averaged 12.99 ± 1.75 (SE) mg ha^{-1} and that in the plots of 6-month-old acacia was 21.76 ± 0.72 (SE) mg ha^{-1}, some 40% higher. This large difference in SOC is clearly not attributable to 0.5 years of growth of a single acacia crop. Similar large and unexplained differences in a range of other soil properties (e.g. exchangeable Ca and Na) between fallow land and young acacia stands, not attributable to the growth of the young trees, were reported. Despite such critical confounding problems, and based on a very small pH, difference of 0.1–0.2 units Dong et al (2012) concluded that soil acidity increased under acacia plantations.

ACIAR Technical Report 84, as published on this page of the ACIAR website, was amended with the text from the paragraph above.

The authors of the paper Dong et al (2014) do not accept that this amendment addresses their concern. *Inter alia*, they make the following points.

1. Technical Report 84 (the Report) states:

> For example, Dong et al (2014) compared fallow shrub/ands in central Vietnam, unavailable for forestry since 1995 following construction of overhead powerlines, with a chronosequence of adjacent acacia hybrid plantations from age 0. 5 years to 5 years. Their results clearly show that the fallow land had several soil properties very different from the land under the acacia age series, which themselves seem to have had a varied history (some plots probably being under their second plantation rotation subsequent to 1995).

The authors of Dong et al (2014) assert that this is incorrect and point out that the second sentence of the abstract from the Dong et al (2014) paper states:

> Soil samples were collected from second- or third-rotation plantations representative of five age classes (0.5–5 years old), and in adjacent abandoned lands as controls.

2. The Report states:

> For example, total SOC in the uppermost 20 cm of soil in the fallow land averaged 12.99 ± 1.75 (SE) Mg ha^{-1} and that in the plots of 6-month-old acacia was 21.76 ± 0.72 (SE) Mg ha^{-1}, some 40% higher. This large difference in SOC is clearly not attributable to 0.5 years of growth of a single acacia crop.

The authors of Dong et al (2014) point out that, as reported, the studies were undertaken in second and third rotation plantations, not six months under a single acacia crop.

3. The Report states:

> Despite such critical confounding problems, and based on a very small difference of 0.1–0.2 units of pH, the study concluded that acacia plantations increased soil acidity.

The authors of Dong et al (2014) argue that at no point in the paper does it state that "the study concluded that acacia plantations increased soil acidity".

The authors of Dong et al (2014) point out that their paper states:

> pH_{CaCl_2} was significantly lower at 0.5 and 5 years (3.78–3.84 v. 3.98), and pH_{H_20} at 5 years (4.30 v. 4.52) (see Abstract)

and

> Whereas pH_{CaCl_2} was significantly lower by ~0.1–0.2 of a unit in plantations at ages 0.5 and 5 years compared with abandoned land, pH_{H_20} was significantly lower only in plantations at age 5 years" (see Results)

while the Discussion refers to:

> slightly lower pH in some age classes

and that:

> there was some indication that Acacia hybrid plantations had ~0.1-0.2 lower pH_{CaCl_2} and pH_{H_20}.

The authors of Dong et al (2014) argue that the difference of 0.1–0.2 units cannot be viewed in isolation, but needs to be compared to the respective standard errors, which are 0.02–0.04, that significant differences were small and they only occurred in some age groups. Hence the authors of Dong et al (2014) argue that they reported them without drawing any more general conclusions.

When interpreting the summary of findings in Dong et al (2014) and their implications presented in this report, ACIAR encourages readers to read the original paper and consider the points presented above.