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*Supplement of*

# Knowledge needs, available practices, and future challenges in agricultural soils

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**Supplement**

Table 1. Categories of effectiveness (Sutherland et al, 2015).

| Category | Description | General criteria | Thresholds |
|---|---|---|---|
| Beneficial | Effectiveness has been demonstrated by clear evidence. Expectation of harms is small compared with the benefits | High median benefit score<br>High median certainty score<br>Low median harm score | Effectiveness: >60%<br>Certainty: >60%<br>Harm: <20% |
| Likely to be beneficial | Effectiveness is less well established than for those listed under 'effective' **OR** There is clear evidence of medium effectiveness | High benefit score<br>Lower certainty score<br>Low harm score<br>**OR**<br>Medium benefit score<br>High certainty score<br>Low harm score | Effectiveness: >60%<br>Certainty: 40-60%<br>Harm: <20%<br>**OR**<br>Effectiveness: 40-60%<br>Certainty: ≥40%<br>Harm: < 20% |
| Trade-off between benefit and harms | Interventions for which practitioners must weigh up the beneficial and harmful effects according to individual circumstances and priorities | Medium benefit and medium harm scores<br>**OR**<br>High benefit and high harm scores<br>High certainty score | Effectiveness: ≥40%<br>Certainty: ≥40%<br>Harm: ≥20% |
| Unknown effectiveness (limited evidence) | Currently insufficient data, or data of inadequate quality | Low certainty score | Effectiveness: Any<br>Certainty: <40%<br>Harm: Any |
| Unlikely to be beneficial | Lack of effectiveness is less well established than for those listed under 'likely to be ineffective or harmful' | Low benefit score<br>Medium certainty score and/or some variation between experts | Effectiveness: <40%<br>Certainty: 40-60%<br>Harm: <20% |
| Likely to be ineffective or harmful | Ineffectiveness or harmfulness has been demonstrated by clear evidence | Low benefit score<br>High certainty score (regardless of harms)<br>**OR**<br>Low benefit score<br>High harm score (regardless of certainty of effectiveness) | Effectiveness: <40%<br>Certainty: >60%<br>Harm: Any<br>**OR**<br>Effectiveness: <40%<br>Certainty: ≥40%<br>Harm: ≥20% |

**Plot data**

Figure 01

| | Mixed amendments | Cover crop | Crop rotation |
|---|---|---|---|
| Number of soil types | 5 | 6 | 8 |
| Number of locations | 3 | 7 | 5 |
| Number of studies | 11 | 12 | 14 |

R script:

```
read.table(file="barplot.txt",header=T)->coverage
attach(coverage)
names(coverage)
barplot(as.matrix(coverage),beside=T, ylim=c(0,18),xaxt="n
",ylab="Coverage of evidence (number of papers)", xlab="Actions
beneficial to soil fertility")
axis(1,at=c(2.5,6.5,10.5),labels=c("Mixed amendments","Cover
crops","Crop rotation"))
legend(6.87,18,c("Number of soil types","Number of
locations","Number of studies"),fill=grey.colors(3))
```

Figure 02

| Effectiveness | Certainty | Negative side-effects |
|---|---|---|
| 69 | 64 | 15 |
| 75 | 67 | 16 |
| 66 | 75 | 8 |
| 65 | 54 | 19 |
| 64 | 46 | 19 |
| 55 | 62 | 18 |
| 51 | 58 | 14 |
| 61 | 72 | 46 |
| 55 | 52 | 64 |
| 70 | 59 | 26 |
| 60 | 64 | 23 |
| 63 | 54 | 29 |
| 53 | 59 | 32 |
| 45 | 44 | 54 |
| 53 | 53 | 34 |
| 46 | 45 | 36 |
| 49 | 45 | 20 |
| 46 | 38 | 33 |
| 58 | 35 | 20 |
| 50 | 33 | 24 |
| 53 | 36 | 16 |
| 54 | 29 | 19 |
| 35 | 37 | 23 |

| | | |
|---|---|---|
| 40 | 31 | 17 |
| 36 | 23 | 19 |
| 14 | 34 | 20 |
| 26 | 40 | 48 |

R script:

```
read.table(file="added.var.txt",header=T)->coverage
attach(coverage)
names(coverage)
spcor((coverage),method=c("spearman"))
install.packages("car")
library(car)
mod1<-lm(eff~cert+neg,data=mydataframe)
avPlot(mod1,cert,neg,main="",xlab="Certainty | Negative side-
effects",ylab="Effectivness | Negative side-effects",grid=T)
```