Basic understanding of weediness/invasiveness to identify key evaluation items for assessment endpoint

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I am

- Weed scientist
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To identify key evaluation items for assessment endpoint

Weeds

- Two view points
  - Value judgment by people
    - Plants growing in places where people do not want to grow
    - Plants to inhibit human activities (ex. Crop production)
  - Biological and ecological characteristics 'weediness'
    - Plants growing naturally on land disturbed by human activities
- Weeds, which are undesirable plants for human, unlike wild plants, can grow in disturbed places by humans, but, unlike crops, do not require active protection by humans.
**Invasive alien plants**

- Invasive alien plants that are non-native to an ecosystem, and which may cause economic or environmental harm or adversely affect human health.
- In particular, they impact adversely upon biodiversity, including decline or elimination of native species - through competition or transmission of pathogens - and the disruption of local ecosystems and ecosystem functions.

Referred from Convention on Biological Diversity web site
https://www.cbd.int/db/2009/about/what/

**Biological and ecological characteristics of major weeds**

- Seed dormancy. Complex factors of environmental requirements for seed germination
- Discontinuous germination. Longevity of seed bank in soil
- Prompt flowering by rapid vegetative growth
- Seed production over the long term
- Self-fertility, but not absolute self-fertility nor Apomixis
- Wind-pollinated or Insect-pollinated not limited to a specific pollinator
- Fecundity
- Phenotypic plasticity
- Adaptive seed dispersal
- Vigorous vegetative reproduction
- Vegetative reproductive organs to easily remain in the ground
- Ability to compete interspecifically by special means (rosette, choking growth, allelopathy etc...)

(Referred from: Ito 1993; Baker 1974)

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**Life cycle of weeds (seed propagation)**

- Seed dormancy
- Seed dispersal

**Differences among weeds, wild plants, invasive alien plants and crops**

- Land disturbed by human → Natural ecosystem
- Can grow naturally ➔ Cannot grow naturally

- Crops
- Weeds
- Wild plants
- Invasive alien plants

Important difference
If you make a weed from a crop,

• You should make it possible to grow naturally
• At least
  – Seed shattering
  – Seed dormancy
• or
  – Vegetative propagation are needed

Even if such traits are changed, it is unlikely that it will become invasive

I think

• As long as changes in seed shattering and seed dormancy of crops do not occur by genetic modification, assessment of their invasiveness will not be needed.

Thank you for your attention!