Agriculture and Biodiversity

28.04.2022; 10.30 to 15.30

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University of Dundee Botanic Gardens, Paterson Centre, Dundee

Time	Activity
1030	Icebreaker
1040	Documentary
1100	Discussion
1115	**Break**
First Discussion - Genetically modified crops	
1125	Divide into groups and small group discussion - Farmers - Scientists - Public
1150	Large group discussion (everyone together)
1215	**Lunch**
Second Discussion – Regenerative farming	
1315	Small group discussion (see above)
1340	Large group discussion (everyone together)
1405	**Break**
1415	Wrap up and voting on policy decisions
1445	Recorded talk from Botanic Garden curator Kevin Frediani followed by Botanic garden walk
1530	**End – Have a wonderful journey home!**

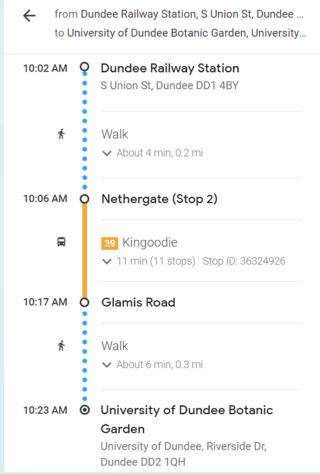# Directions to the Botanic Garden

If you are travelling via public transport, the easiest way to get to the gardens from Dundee railway station is by taking the number 39 bus (to Kingoodie) and riding the bus from Nethergate Stop 2 to Glamis Road.
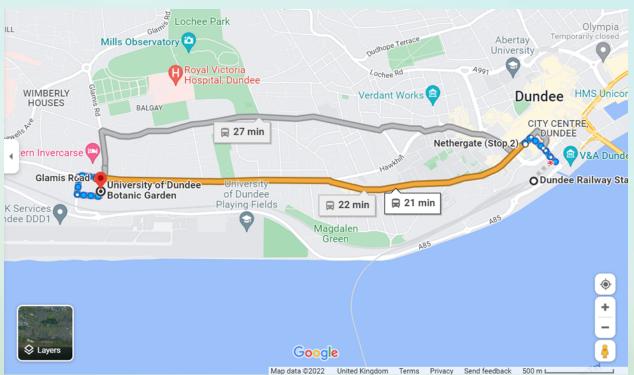
Walk a few minutes to the Botanic Garden entrance where one of us will meet you and escort you to the Paterson Centre
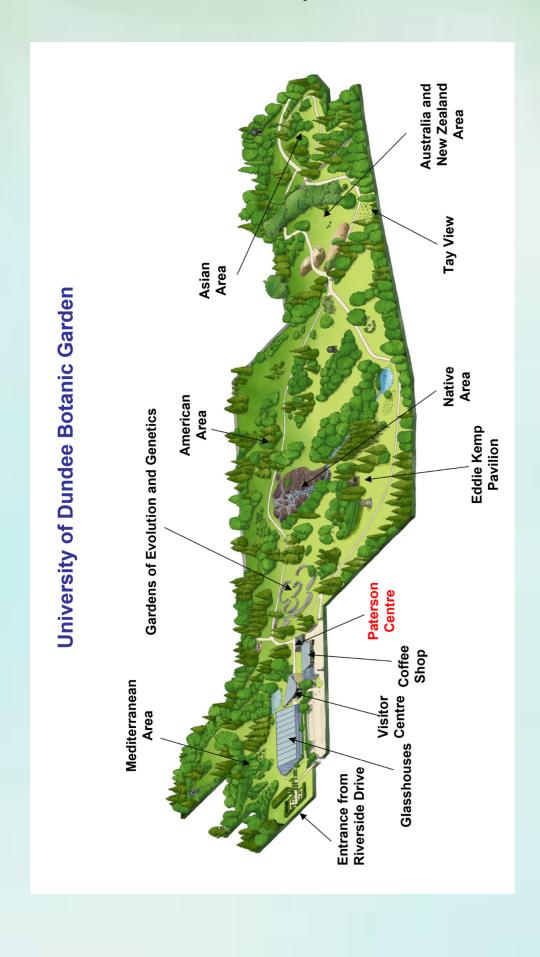
When taking the bus you may wish to ask for a student Day Rider ticket, this will cost £2.70 and will cover your bus travel there and back for the day.

Alternatively, there is a taxi stand outside the railway station and many scattered around the city centre (minutes walk from the station)

If you have any issues call **Rumana** on **07932842241**

University of Dundee Botanic Garden

Group: Scientists

This group will represent the potential opinions of scientists on genetically modified crops (topic 1) and regenerative farming (topic 2). You may wish to convey the opinion of those working directly in the field or a broader scientific outlook on the subject matter.

Please take around 25mins to discuss how each topic is investigated and plan to be implemented by scientists. You may choose to represent the views of those working to implement GM and regenerative farming in the UK and globally (developing countries).

Topic 1: The use of genetically modified crops

The European Union has allowed Scotland to opt-out of the cultivation of EU approved GM crops, with 19/27 of EU countries also voting to either partially or fully ban GM crops. With Scotland's relationship and trading with other countries vital to its economic growth and success, the research into agriculture and the environment is quintessential to the Scottish economy.

For more info about GM's in the world level, access: https://www.fao.org/3/cb8375en/cb8375en.pdf

For further info about the last 20 years of GM research, check: http://nap.edu/23395

As the scientists' group, you may wish to discuss points such as:

- Food security for a growing population
- Growing crops resilient to climate change and pathogen invasion - an example, transgenic bananas https://www.nature.com/articles/s41467-017-01670-6
- The inability of biotech companies to grow GM crops due to Scottish legislation - https://www.gov.scot/policies/agriculture-and-the-environment/gm-crops/
- The scope for GM crops globally
- Science communication, knowledge exchange and outreach with farmers and the general public

Topic 2: Regenerative/conservation farming

Regenerative farming aims to enhance ecosystem health by implementing some or all of the following practices: reduced till/ploughing, reduction or removal of chemical inputs (man-made fertiliser, pesticides etc), and increasing areas set aside for conservation. In order to reduce chemical inputs on regenerative farms livestock are often used as a natural fertiliser and weed control.

As the scientists' group, you may wish to discuss points such as:

- What alternatives could we use to chemical inputs (microbial inputs) and how to sell these to farmers and the public
- The viability of these farming techniques against climate change and pathogen invasion
- Schemes are being put in place by the government to encourage regenerative agriculture without clear evidence of the benefits for biodiversity.
- The variability in the definition of what 'regenerative farming' makes it difficult to test its effects (ie: farmers' views of how to implement regen farming are highly variable).

The evidence so far: regen farming reduces yield but increases profitability; organic matter is higher on regenerative farms; insect pests are lower on regen farms. Source: doi.org/10.7717/peerj.4428

Group: Farmer

This group will represent the potential opinions of farmers on genetically modified crops (topic 1) and regenerative farming (topic 2). Please take around 25mins to discuss how each topic may affect farmers. You may choose to represent UK farmers, or farmers elsewhere (for example, in developing countries).

Topic 1: Use of GM on farms

Genetically modifying crops can improve yield in a variety of ways depending on which gene is targeted. Crops can be modified to enable them to withstand drought, waterlogging or wind, produce larger fruits/seeds, be resistant to herbicides, be resistant to pathogens, food with more nutrients, grow faster and or with fewer nutrients. (These are just a few examples).

Discussion hints

As farmers, you may want to discuss issues such as:

- Yield.
- Costs of GM seed versus possible reduction of inputs.
- Accessibility to GM seed.
- Public opinion.
- The market for GM produce.
- Greenhouse gas emissions targets.

Topic 2: Regenerative/conservation farming.

Regenerative farming aims to enhance ecosystem health by implementing some or all of the following practices: reduced till/ploughing, reduction or removal of chemical inputs (man-made fertiliser, pesticides etc), and increasing areas set aside for conservation. In order to reduce chemical inputs on regenerative farms livestock are often used as a natural fertiliser and weed control. Regen farming often reduces yield when compared with conventional high-input farming, though this does not necessarily translate into a reduction in income, due to less money spent on inputs.

For more information regenerative farming and how it impacts farmers check out: [Stepping forward into regenerative agriculture | AHDB](#)

Discussion hints

You could discuss, as farmers, how regenerative farming could impact:

- Decrease Yield and increase income.
- Selling of produce to supermarkets.
- Costs of inputs (ie: fertiliser, pesticides, herbicides, fuel). Including rising costs of fertiliser and fuel.
- Greenhouse gas emissions targets.

Group: General Public

This group will represent potential opinions of the public on genetically modified (GM) crops (topic 1) and regenerative farming (topic 2). Please take around 25 minutes to discuss how each topic may affect the public and their opinions. You may choose to represent a passionate vegan, an anti-GMO activist, a conservative or just a concerned citizen (or all of them).

Topic 1: Use of GM crops

In the EU, the only GM crop being grown is GM Maize, even though nearly 60 more are approved for use. The general trend is away from GM crops but due to the recent pressure to find ways to make agriculture more sustainable, some countries are moving towards encouraging GM crops to be grown by farmers. In countries, where GM crops are frequently grown (e.g., China) the opinion of the general public is either opposed (41%) or neutral (47%) about the use of GM crops only a few show support (12%). This opinion often varies depending on which application it is used (e.g., food/feed crop)

Discussion hints

- Not natural
- Lack of familiarity/fear of the unknown
- Genes come from a non-vegan source
- Playing god
- Afraid of
    - Allergic reactions
    - That engineered genes will be introduced to other crops (interbreeding between wild and GM crops)
    - Antibiotic resistance
    - General impacts on human/wildlife health
- Cheaper
- Fewer pesticides (can often be labelled as insecticide-free)
    - Potential to be good for bees
- GM crops can not only be used for food crops but also as animal feed, or for medical applications
- Poorly resilient to disease – concern about food security
- Anti-GM activist (only)
    - Radioactive
    - Afraid that gm-crops cause infertility/gene modification of their own body
    - Do not want to live close to fields with GM crops

Useful resources

https://www.nature.com/articles/s41538-018-0018-4#:~:text=The%20survey%20resulted%20in%2011.9,%E2%80%9Cunfamiliar%20with%20GM%20technology%E2%80%9D.

Topic 2: Regenerative/conservation farming

Regenerative farming aims to enhance ecosystem health by implementing some or all of the following practices: reduced till/ploughing, reduction or removal of chemical inputs (man-made fertiliser, pesticides etc), and increasing areas set aside for conservation. To reduce chemical inputs on regenerative farms livestock are often used as a natural fertiliser and weed control.

Discussion hints

- Lack of familiarity
- Price increase
  - Many people are not willing to pay more for crops grown using labels such as the 'grown using regenerative agriculture'
- Many are critical about
  - The actual effectiveness/high uncertainty
  - The taste difference (especially concerning meat)
- Others think that
  - Food is more nutritious
  - Positive impact on the land/wildlife

Useful resources

https://www.bbc.com/future/article/20211020-carbon-farming-a-better-use-for-half-earths-land

https://www.theguardian.com/food/2021/jul/18/sustainable-isnt-a-thing-why-regenerative-agriculture-is-foods-latest-buzzword

https://www.fwi.co.uk/news/opinion-regenerative-farming-is-more-than-just-a-buzzword