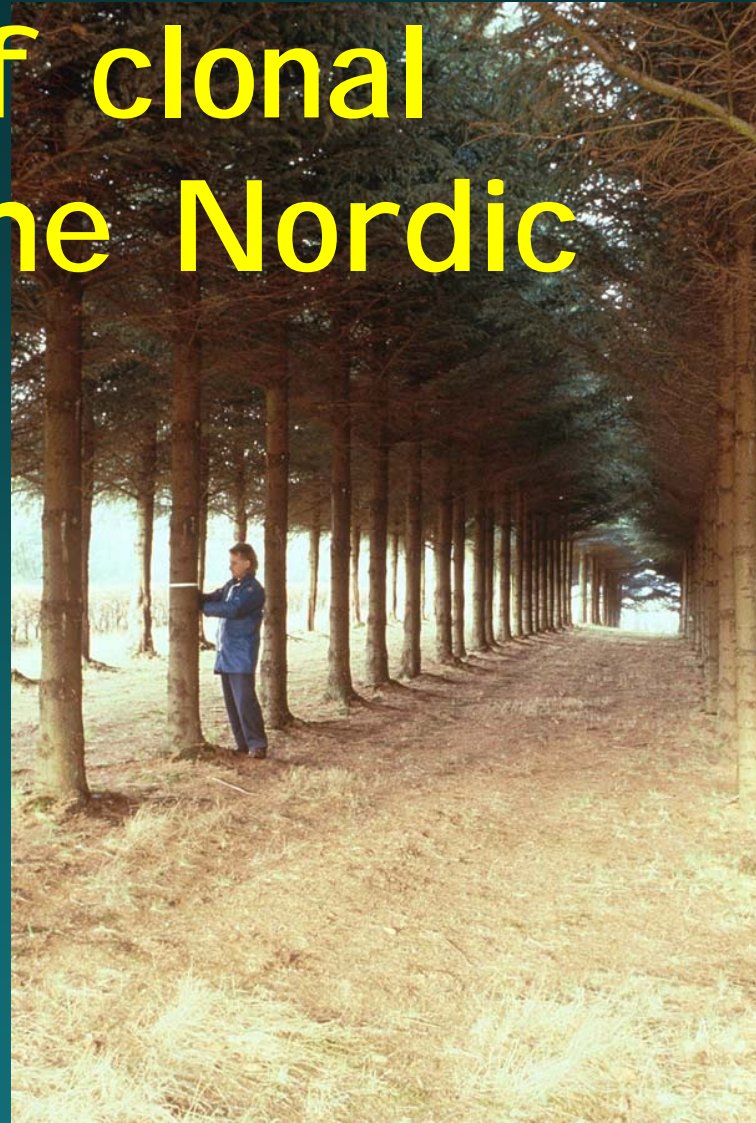


The status of clonal forestry in the Nordic countries

Questionnaire returns

By: Steve Lee

Forest Research, Great Britain.



Forest Research

Definition:

- for the purpose of this questionnaire

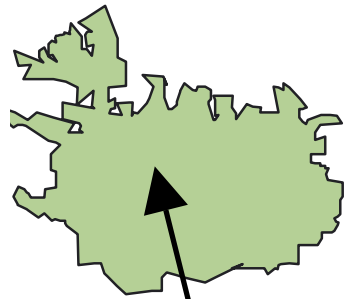
Clonal Forestry was
considered to be the commercial
development of tested clones



Is clonal forestry currently being practised?

Denmark	No
Estonia	No
Finland	Yes
Iceland	Yes
Lithuania	No
Norway	No
Sweden	Yes
UK	No





Norway Spruce:
10,000 ha non-tested;
1,000 ha tested

Hybrid Aspen: 400 ha;
10 years

Poplar: 1,000 ha since
many years

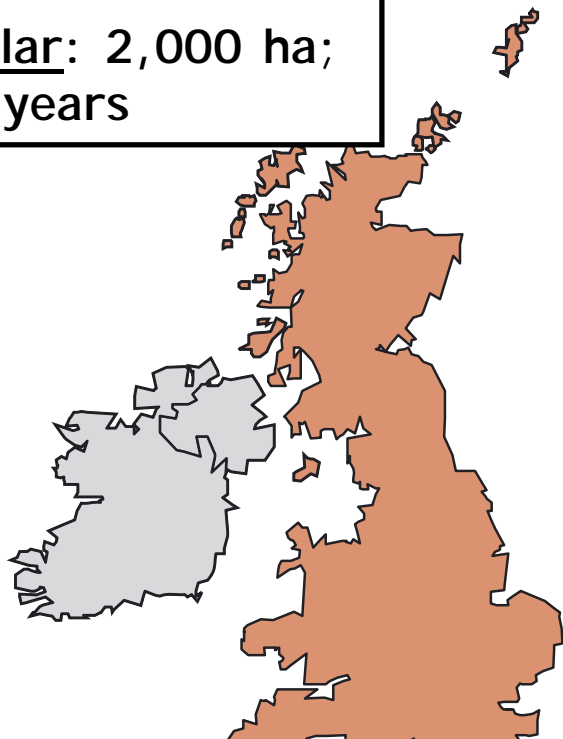
Norway Spruce: 250 ha
non-tested; 20 ha tested

Hybrid Aspen: 760 ha; 5
years

Birch: Curly (10years) and
Silver (13 years) 1,400 ha

Aspen: small area;
6 years

Poplar: 2,000 ha;
12 years



Are you already producing
rooted cuttings
to bulk up limited supplies
of scarce seed lots?



Already
producing rooted
cuttings?

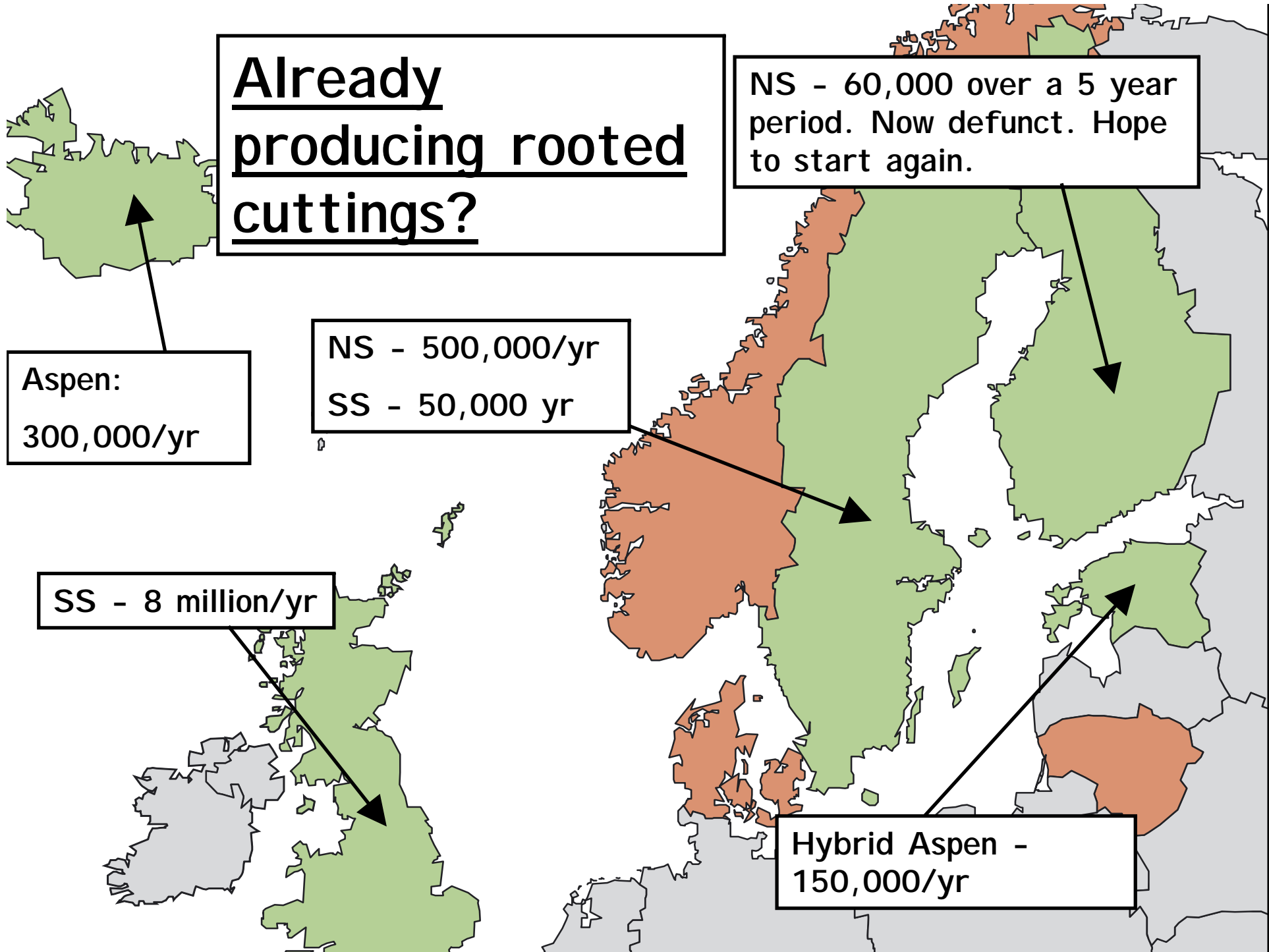
NS - 60,000 over a 5 year period. Now defunct. Hope to start again.

Aspen:
300,000/yr

NS - 500,000/yr
SS - 50,000 yr

SS - 8 million/yr

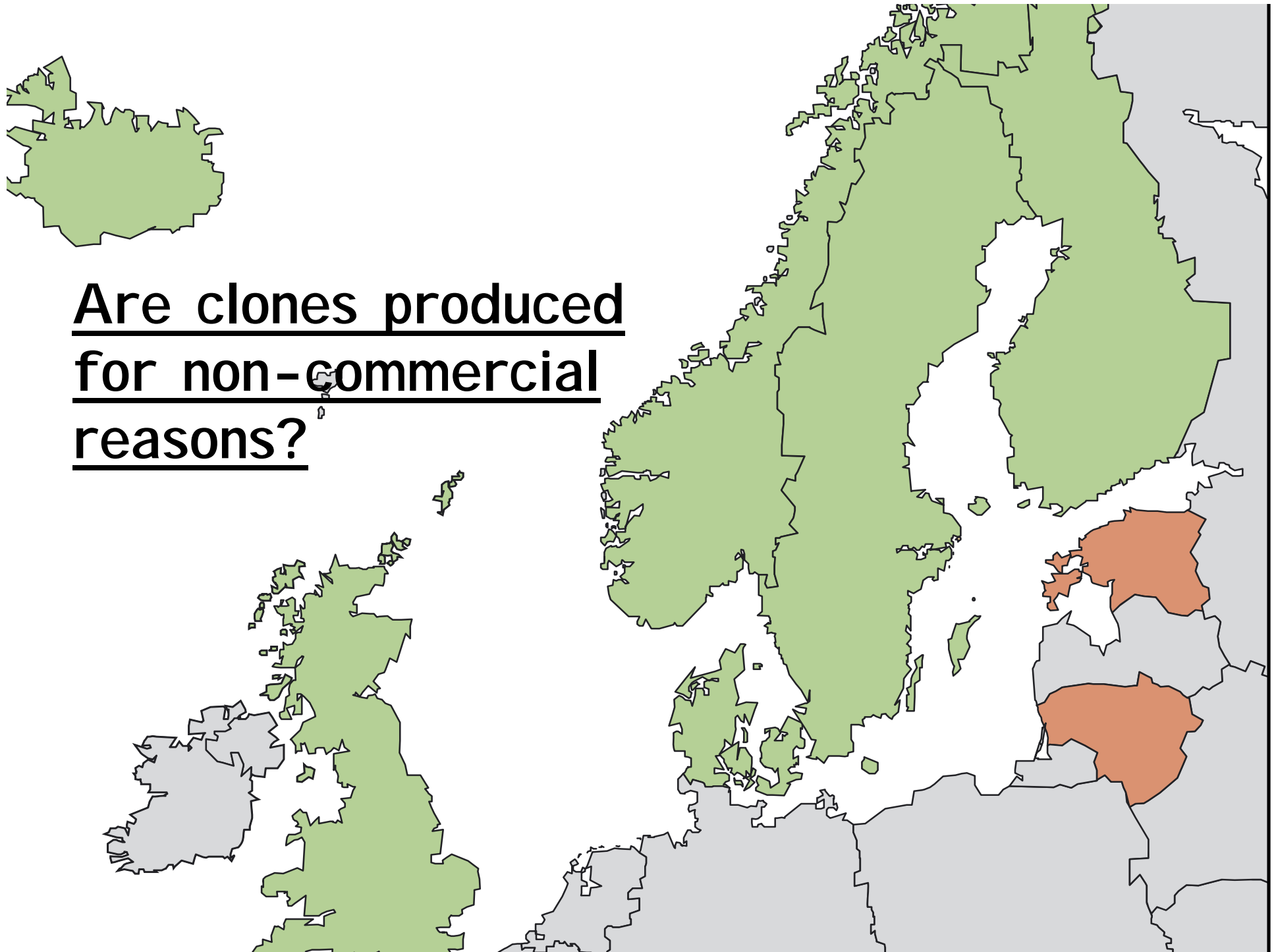
Hybrid Aspen -
150,000/yr



Are clones produced for
non-commercial reasons
e.g. physiological or
pathological studies ?



Are clones produced
for non-commercial
reasons?



If clonal forestry needs certain developments before it can become operational, what are they?



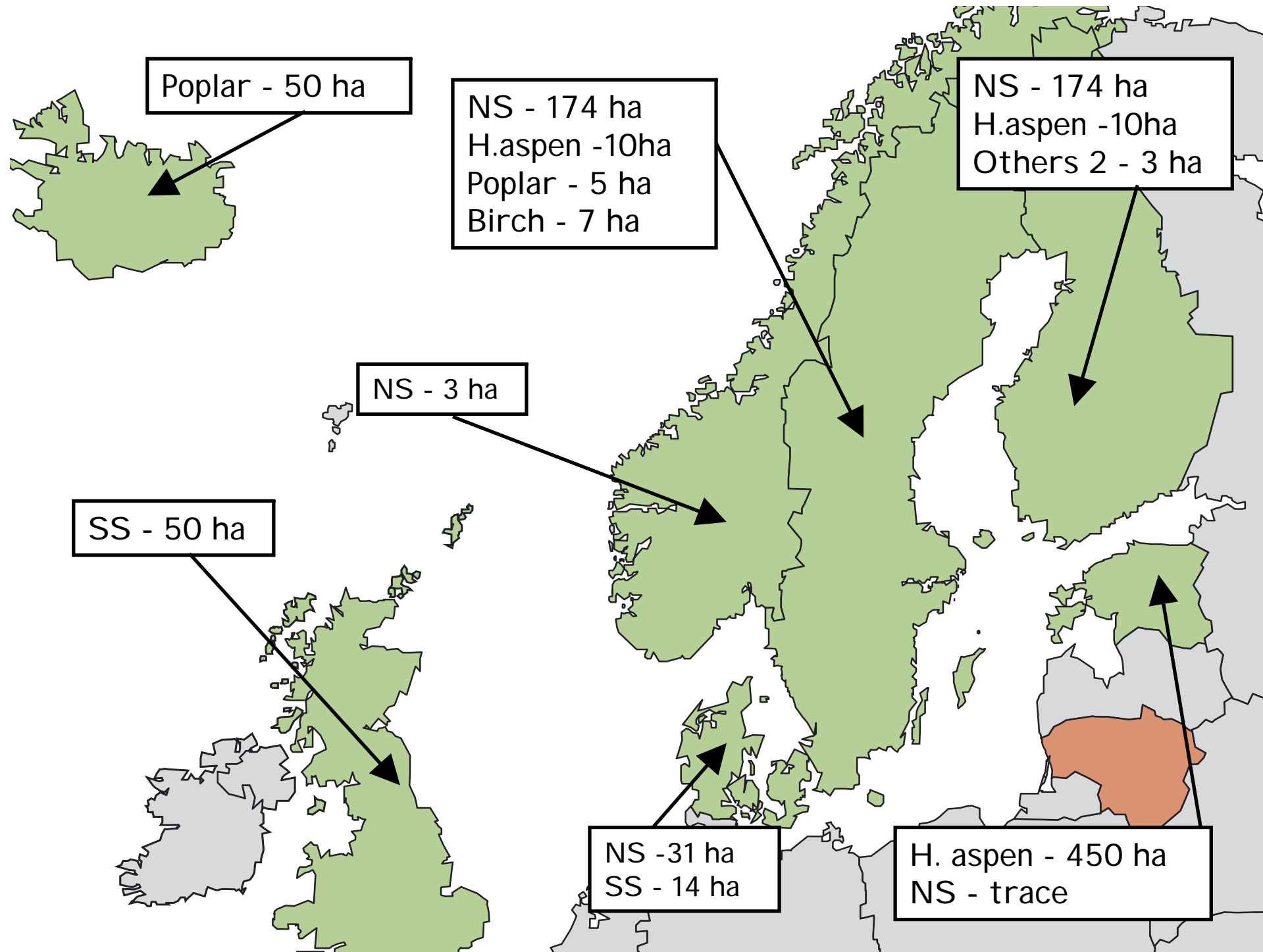
<u>Technology</u>	<u>Size of Problem</u>	<u>Years until solved</u>
S. Embry.	Big (2)	2 to 10 years
	Medium (3)	
	Small (2)	
Cryopreser.	Medium (3)	3 to 5 years
	Small (2)	
Meristem TC	Big (1)	0 to 10 years
	Medium (2)	
	Small (1)	
Rejuvenation	Big (4)	5 to 20 years
	Small (1)	



Do you have clonal tests
established ?



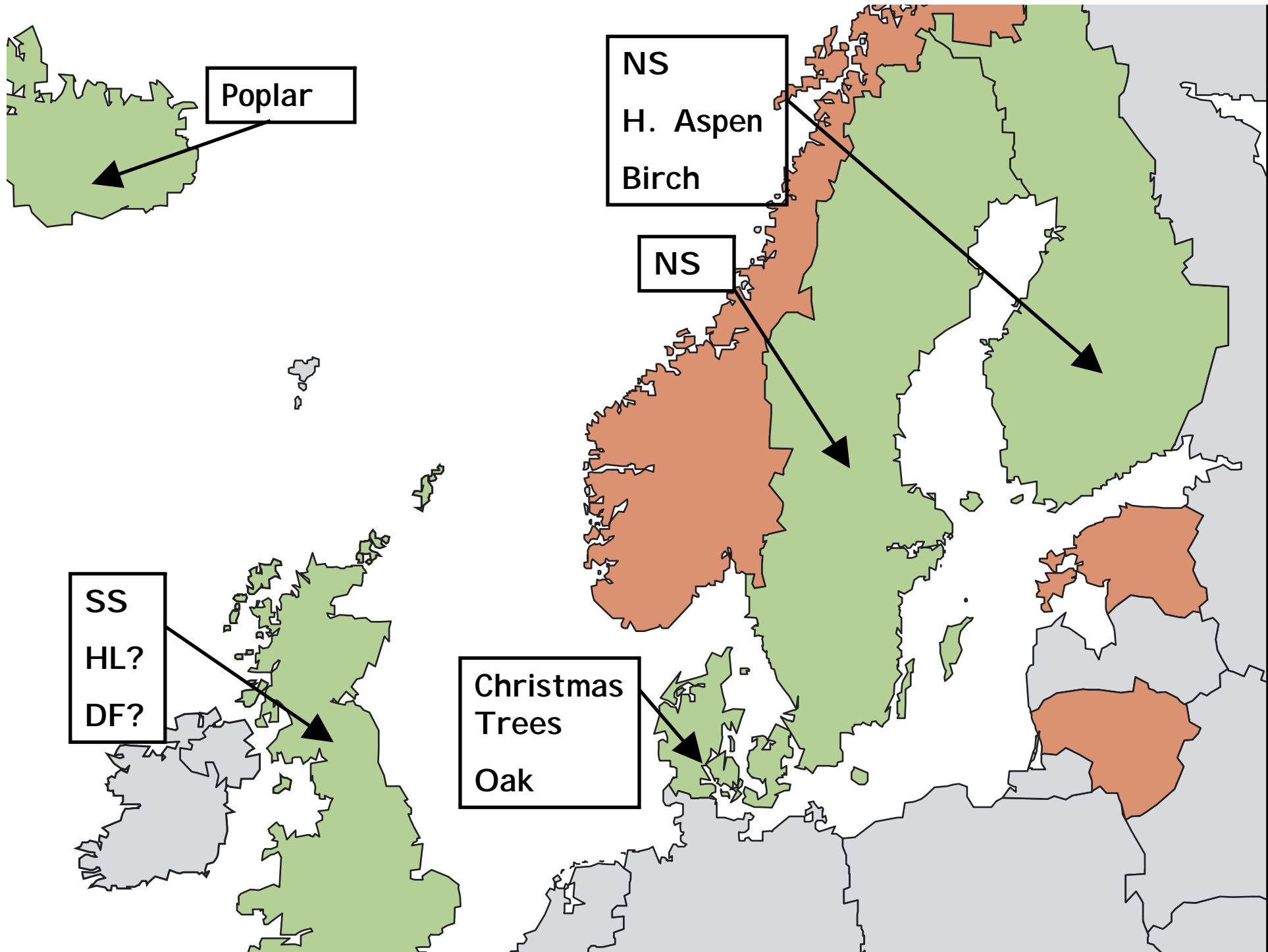
Forest Research



Is clonal
forestry
a tree breeding
objective?



Forest Research



Poplar

NS
H. Aspen
Birch

NS

SS
HL?
DF?

Christmas
Trees
Oak

Why is clonal forestry an objective?

- Extra gain relative to Seed Orchard x2
- Packaging of traits to meet specific demands x2
- Uniformity + Quality x2
- Screening for disease (Poplar)
- Faster + more precise testing
- Bulk up scarce seed (oak)



Why is clonal forestry NOT an objective?

- Costs are too high (development and perceived production costs) x4
- Environmental concerns x2
- Legislation against the use of clones
- Technological problems



**Is there a demand for
clonal forestry from
outside of tree breeding?**



Demand from?

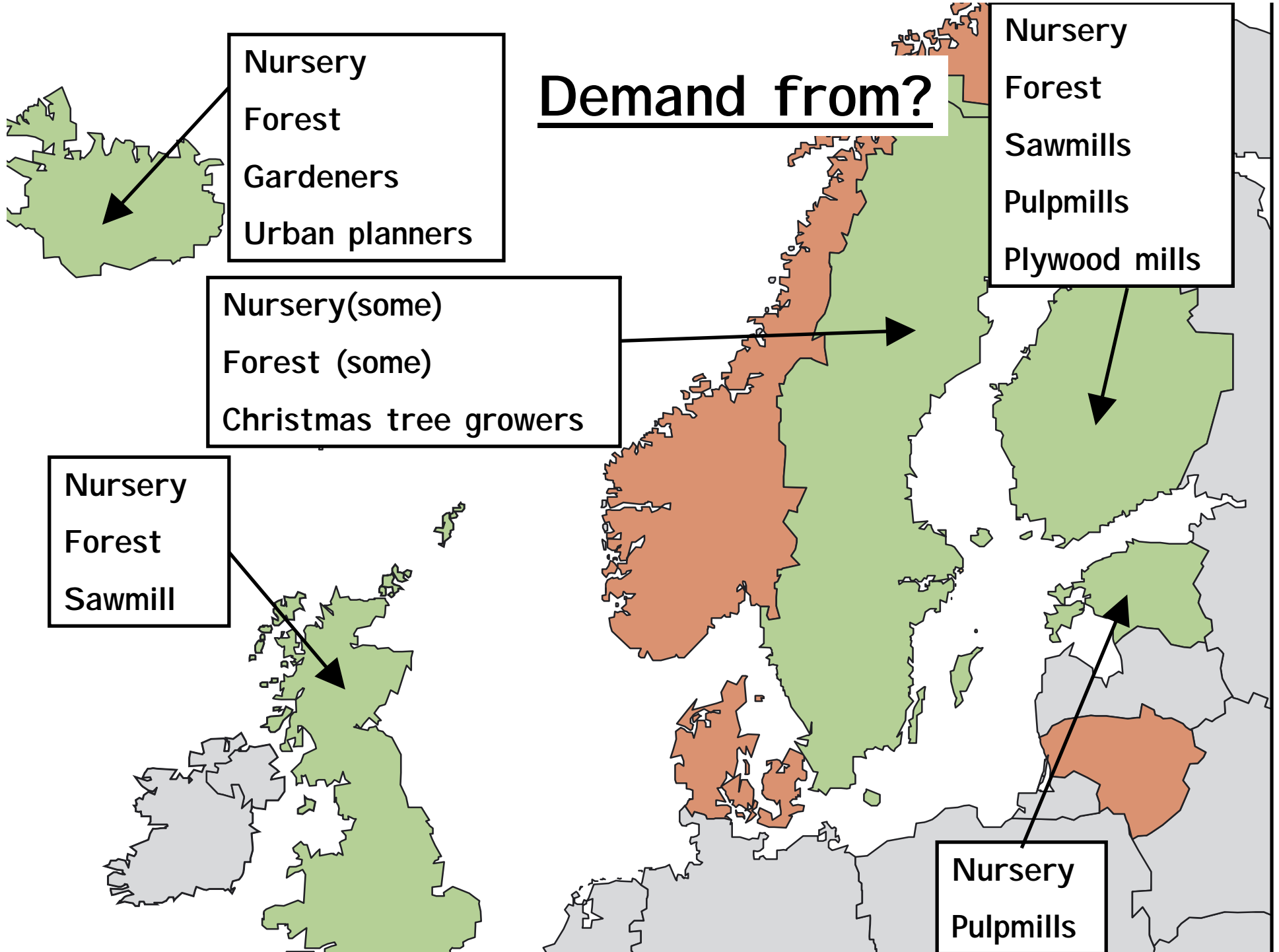
Nursery
Forest
Gardeners
Urban planners

Nursery(some)
Forest (some)
Christmas tree growers

Nursery
Forest
Sawmill

Nursery
Forest
Sawmills
Pulpmills
Plywood mills

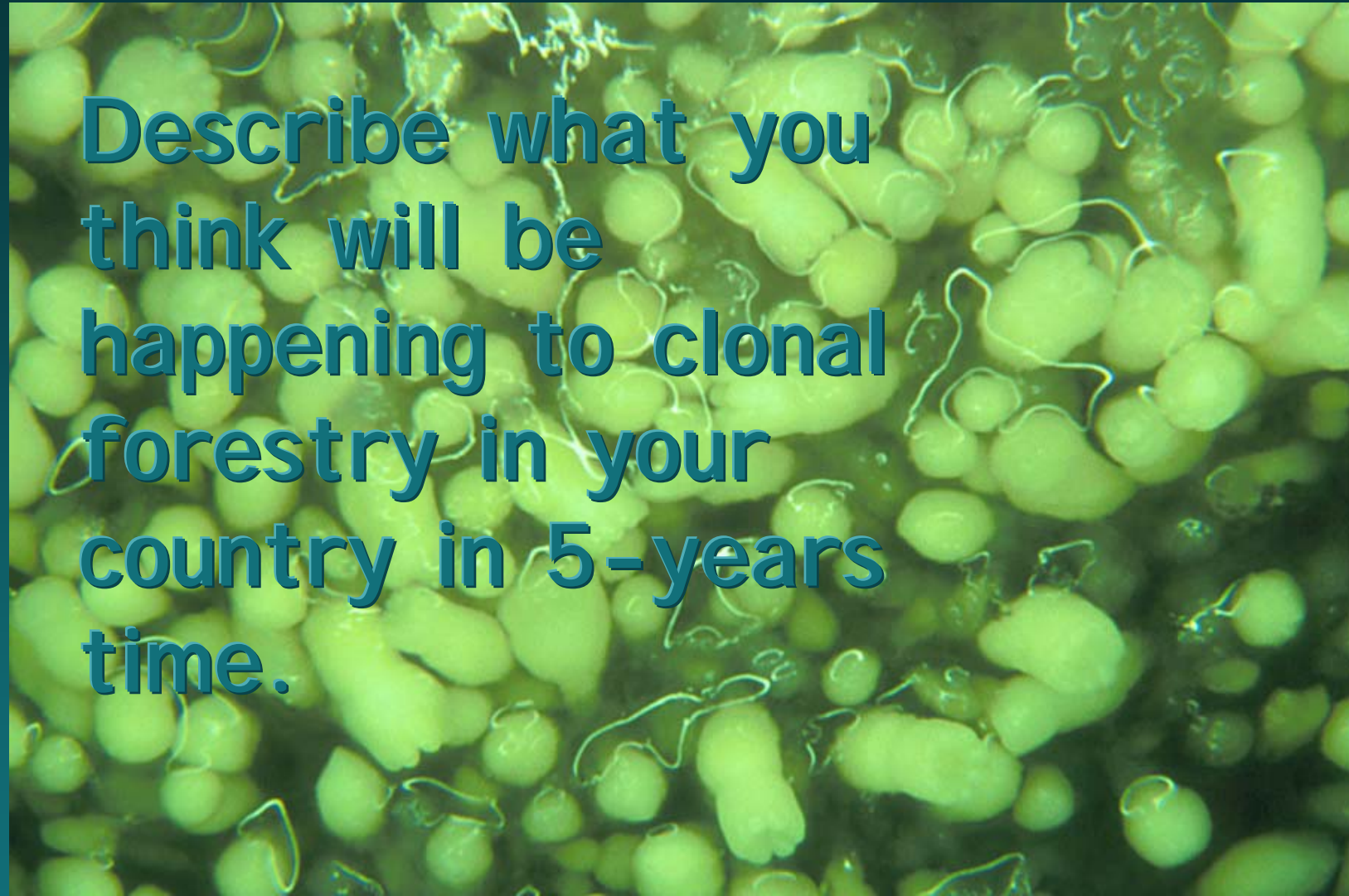
Nursery
Pulpmills



If all technical problems were overcome and you could meet *your* clonal forestry objectives today, are there other barriers to overcome?

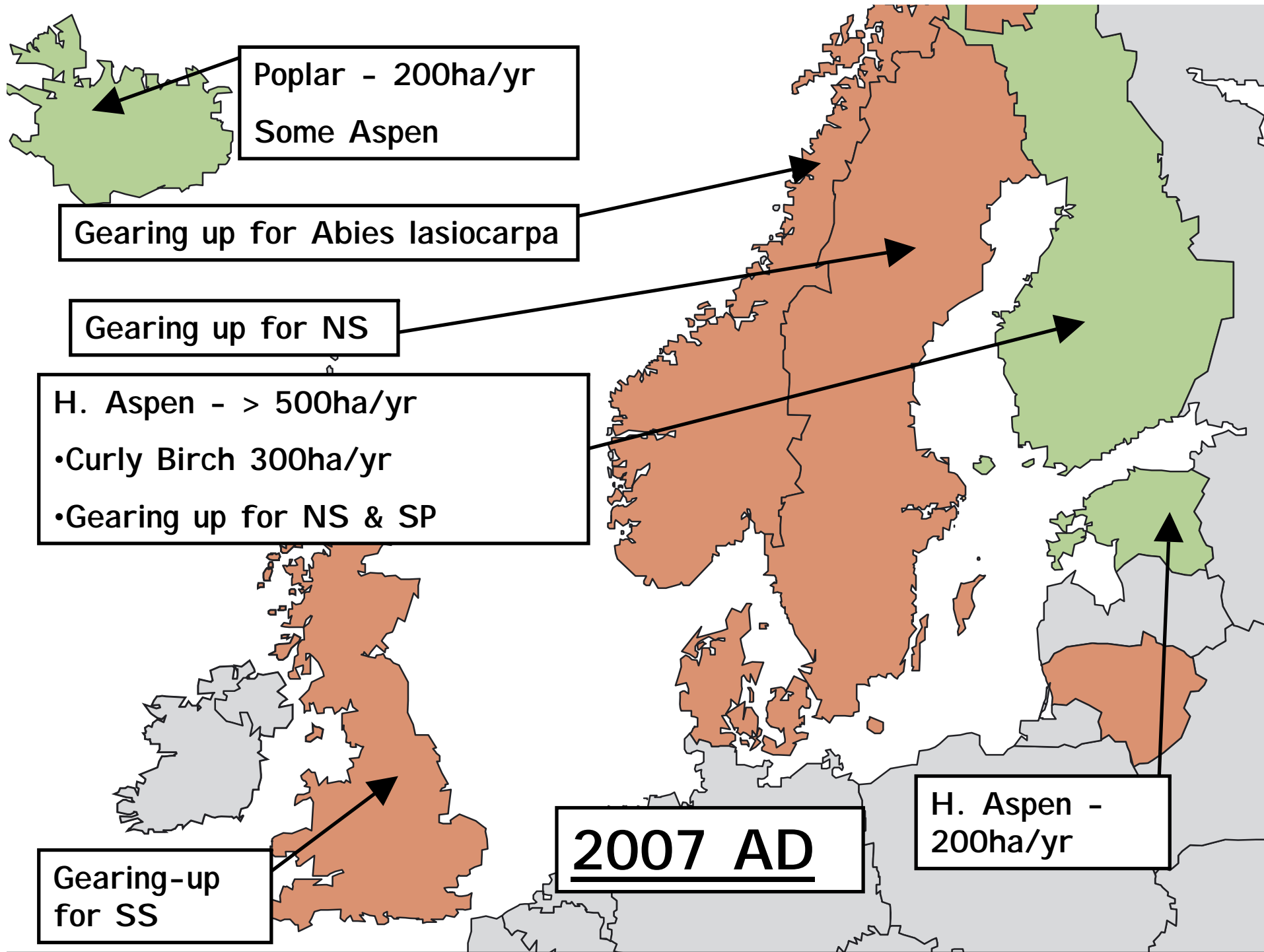
- Public Acceptance x6
- Certification x4
- Regulations (National) x5
- Regulations (EU) none
- Cost x5
- Gains not proven x1

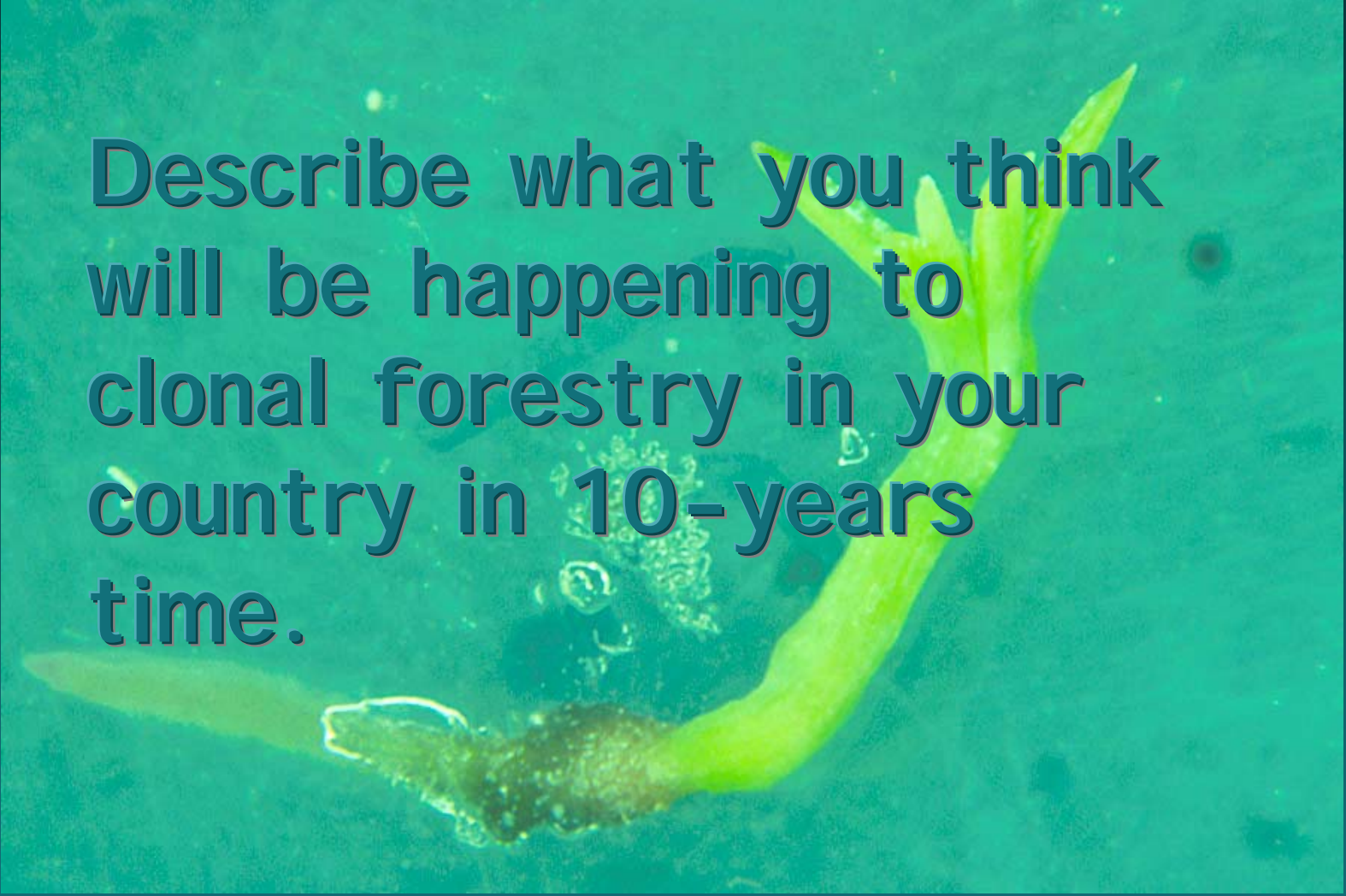




Describe what you think will be happening to clonal forestry in your country in 5-years time.



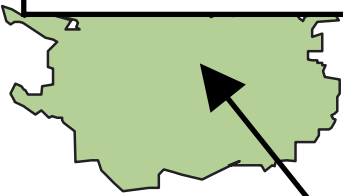




Describe what you think will be happening to clonal forestry in your country in 10-years time.



2012 AD



Poplar 500ha/yr
No change to Aspen

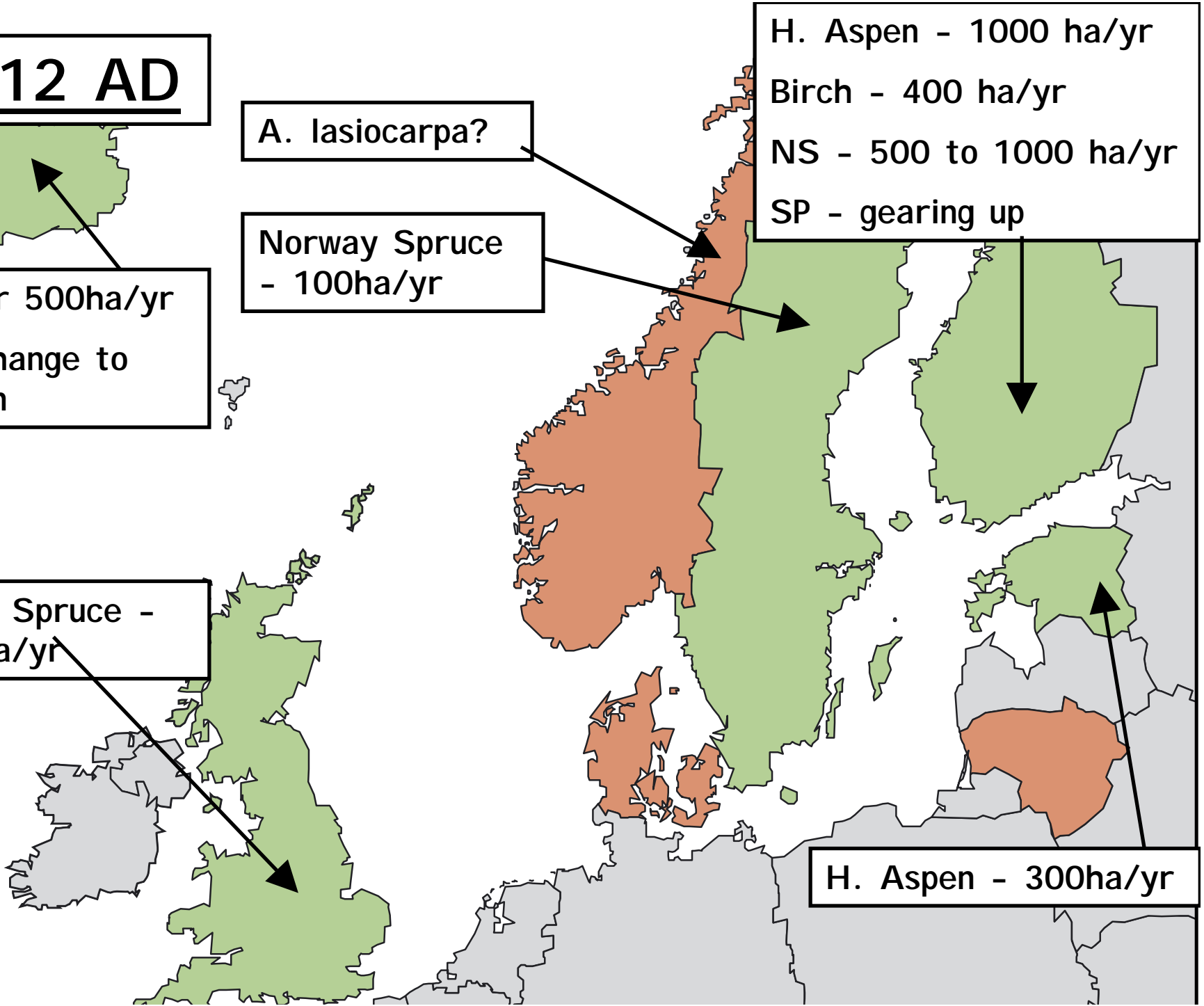
A. lasiocarpa?

Norway Spruce
- 100ha/yr

H. Aspen - 1000 ha/yr
Birch - 400 ha/yr
NS - 500 to 1000 ha/yr
SP - gearing up

Sitka Spruce -
500ha/yr

H. Aspen - 300ha/yr

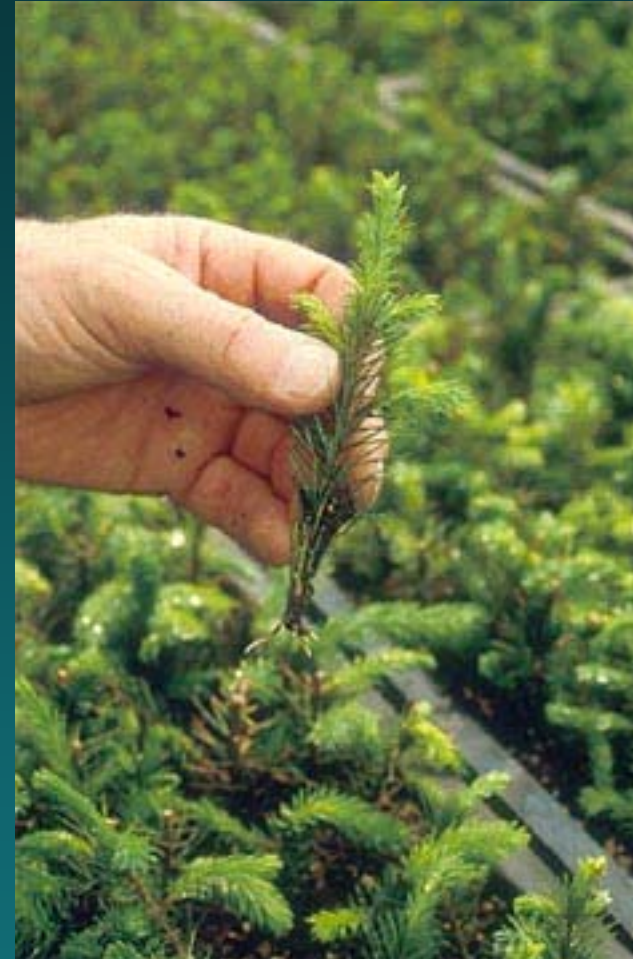


Questionnaire Returns

How can this information be summarised?

Nobody in the Nordic and Baltic states is really practising true clonal forestry on tested **CONIFER** clones

Any clonal forestry so far is small scale and generally with Aspen or Poplar



More countries are using vegetative propagation to bulk up scarce seed sources, but in most cases it too is small-scale.





- Most countries are producing clonal material in some capacity at a research level
- So why is clonal forestry not being practised at a commercial level, NOW?



Answer:



Technological problems and certain other barriers.



Forest Research

Most countries that want clonal forestry think the future is along the lines of Somatic Embryogenesis and Cryopreservation - operational 2 to 10 years from now?

Little hope is placed in re-juvenation.

Variable hope placed in Meristem TC - depends on species



So if the technical problems were overcome, and the cost was as cheap as seedlings, perhaps more countries would be interested in clonal forestry and for more species.



The main 'other' problems are:

Public Acceptance

Certification (varies from country
to country)

National Regulations

Cost - but this issue may disappear
if the technology is worked out.



- The next 5-years are ones of development - finalising SE and cryopreservation. Not likely to see hillsides covered with clonal material
- 10-years from now interested countries hope to be fully operational with their main conifer species.
- The next step could be one of educating the public, policy makers, and budget holders



Clonal Forestry? Who are you kidding!

Are we kidding ourselves?

Clonal Forestry could happen ...
really happen if we want it to.

The technical problems will not be
the major obstacles.





The end.

