

Stakeholder Engagement Strategy



Plant Cell Wall Research: Context for Stakeholder Engagement

Plant cell wall research is distinguished by the exceptional complexity of the cell wall structure which comprises large biological macromolecules as well as inorganic components. Understanding the synthesis, modification, and function of plant cell walls in development and environmental interactions, therefore, requires an inherently multidisciplinary approach that integrates molecular biology, biochemistry, genetics, biomechanics, and related fields.

Although most plant cell wall research is fundamental and aims to elucidate biological principles and mechanisms, its findings have considerable potential for applications in agriculture, bioenergy, and the development of sustainable bio-based materials. Compared with larger life science disciplines, such as medical biotechnology, however, the plant cell wall research community is relatively small and faces several discipline-specific challenges.

One of the most significant challenges concerns the availability of appropriate research technologies. **Many imaging platforms, biochemical analytical instruments, and associated software have been developed primarily to serve larger research communities and are not fully suited to the specific requirements of advanced plant cell wall studies.** Consequently, there is a need to stimulate the development of more specialised instrumentation capable of addressing biological questions that remain inaccessible because of current technical limitations. During the preparation of the COST Action, the community also identified increasing private-sector engagement, accelerating technology development, and improving the translation of research outcomes into innovation and commercial applications as key priorities. These considerations provide the foundation for the PlantWallK stakeholder engagement strategy.

Summary of Survey Responses Related to Stakeholder Engagement

To better understand the needs and expectations of the PlantWallK community, a comprehensive survey was conducted among the COST Action members between June and July 2026. Several questions focused specifically on stakeholder engagement and collaboration beyond academia.

Stakeholder engagement emerged as an important, although not universal, theme. Approximately 26% of respondents (37 of 142) proposed specific stakeholder groups to engage, while a similar proportion did not answer the question, and many indicated that they had no specific suggestions. Nevertheless, the responses revealed a remarkably consistent vision for strengthening the links between fundamental research on plant cell walls and their practical applications.

The stakeholders mentioned most frequently were industrial partners, particularly those associated with plant biomass and agricultural value chains. Respondents identified plant biotechnology companies, seed and breeding companies, agricultural technology firms, food producers, forestry and biomaterials industries, paper and pulp manufacturers, textile companies, and the biofuel and biorefinery sectors as valuable collaborators. These organisations were viewed as natural partners that could facilitate the translation of advances in plant cell wall biology into innovations in sustainable agriculture, crop improvement, and bio-based products.

A second major stakeholder group comprised technology developers and instrument manufacturers. **Respondents repeatedly referred to microscopy companies, including Bruker, Nikon, Leica, Zeiss, and Olympus, as well as suppliers of analytical reagents and developers of emerging analytical technologies.** There was a strong consensus that these companies should be involved in identifying technological bottlenecks, co-developing new imaging and analytical tools, and providing researchers with access to innovative technologies.

Several respondents also highlighted the importance of engaging research infrastructures and complementary scientific communities. Examples included core facilities, agricultural research institutes, open-source software developers (such as the ImageJ/Fiji community), bioinformaticians, and computational scientists. These partnerships were considered essential for improving data analysis, sharing expertise, developing standardised methodologies, and promoting interoperability across research groups.

Beyond industry and academia, respondents proposed engaging a wider range of societal stakeholders, including farmers' organisations, growers' associations, cooperatives, policymakers, funding agencies, scientific publishers, germplasm banks, and open-science organisations. Several respondents also recognised the important role of science communicators in increasing public awareness and demonstrating the broader societal relevance of plant cell wall research.

When asked to prioritise stakeholder groups, respondents most frequently selected:

Funders: 39 responses (27.5%)

Investors: 27 responses (19.0%)

Manufacturers: 27 responses (19.0%)

Start-ups: 25 responses (17.6%)

Policy makers: 17 responses (12.0%)

Entrepreneurs: 16 responses (11.3%)

End users: 16 responses (11.3%)

Vendors/distributors: 8 responses (5.6%)

NGOs: 7 responses (4.9%)

Respondents also proposed several practical mechanisms for stakeholder engagement. **The strongest consensus centred on organising joint workshops, conferences, training schools, and technology demonstration events where researchers, industry representatives, and instrument manufacturers could exchange knowledge and identify opportunities for collaboration.** Many respondents suggested involving industrial partners in collaborative research projects and grant applications, inviting company representatives to COST meetings and webinars, and creating opportunities for co-developing new technologies. Others emphasised the importance of maintaining a genuine two-way dialogue, enabling researchers to communicate unmet technological needs while allowing companies to showcase emerging solutions and better understand future scientific demands.

Action Plan

Based on the survey findings and discussions during the PlantWallK Kick-off Meeting in Prague, the Management Committee developed the following stakeholder engagement action plan:

- Invite representatives from at least three leading microscope manufacturers to Working Group meetings or workshops to present their technologies and discuss future research needs.
- Develop and distribute an online questionnaire to at least ten potential stakeholders to further refine the stakeholder engagement strategy and identify additional collaboration opportunities.
- Include at least one leading manufacturer of analytical instrumentation as an active participant in a PlantWallK Training School.
- Introduce a dedicated plenary discussion on stakeholder interactions and collaboration experiences during Working Group meetings.
- Identify and establish initial contacts with at least three start-up companies with potential interest in plant cell wall research and its applications.

Conclusion

The survey demonstrates that PlantWallK participants view stakeholder engagement as an important opportunity to strengthen collaboration beyond academia and to maximise the scientific, technological, and societal impact of the COST Action. There is broad support for establishing partnerships with industry, technology developers, research infrastructures, agricultural stakeholders, policymakers, and funding organisations. These collaborations are expected to accelerate innovation, improve access to advanced technologies, facilitate the development of new analytical tools, and enhance the translation of fundamental plant cell wall research into practical applications with economic and societal value.