Student Responses to a Challenge-Oriented Research and Training Project

Sustainability Competencies for Rural Development: Lessons from China

Sustainable development goals (SDGs) in higher education play a key role in cultivating sustainability competencies (SCs) for future leaders. Depending on geographic location and cultural perspectives, people may have different definitions of SCs, which affects their pedagogic approach and attitude to curricular reform. Based upon the experience of a Global Challenge Research Fund Pilot Project in rural China, we argue that challenge-oriented thinking should be a priority of SCs so that staff and students may, with open minds, hear voices, meet challenges, and accept good practice from multiple stakeholders. This need for challenge-oriented research and training for rural development may be seen in the responses from participatory students at two Chinese universities. The article sheds new light on university-community partnerships for SCs development.

**The Sustainable Development Goals (SDGs) attempt to address the global challenges we face, including poverty, inequality,** climate change and environmental degradation which are interwoven. The top two among 17 goals to be achieved by 2030 were the elimination of poverty and hunger. These are tasks for rural development in the developing world where the vast majority of the world's poorest, whose livelihoods depend upon traditional subsistence agriculture, live (FAO, 2019). Towards a better and more sustainable future for all, the SDGs call for participation from all countries and sectors, including Higher Education (HE). The participation of HE in sustainable development can be traced to the United Nations Decade of Education for Sustainable Development (2005-2014) which states that universities should function as places of research and learning for sustainable development (UNESCO 2004).

This is because HE plays a vital role in sustainability competencies (SCs) among students, the new generation of intellectual leaders for sustainable development (UNESCO 2017, IAU 2017). This is both a curriculum development and a pedagogic issue. The political, economic, social, and cultural diversity of the real world complicates its resolution. Although there is a broad consensus on the SDG's themselves, there are, unsurprisingly, different interpretations of what are effective SCs. As we have indicated, this affects both curriculum and teaching and learning. It is complicated by the need to achieve successful university-community partnerships. Given that poverty alleviation and food security are the top two priorities of the SDG programme, we argue that the challenges facing rural capacity building should be prioritised and integrated into university and higher education curricula as Sustainability Competencies (SCs).

Participation in Rural Development

The rationale of higher education participation in rural development is part of a global challenge to empower some five hundred million small farmers. These have a crucial role in feeding two-thirds of the population of developing countries, i. e. about 2 billion people. Poverty and food insecurity is caused by multiple and complex factors and require holistic understanding if there is to be an effective intervention. Universities and higher education generally are potentially critical partners in that they can suggest ideas, construct platforms and mechanisms for innovation and implementation by communities and stakeholders. The
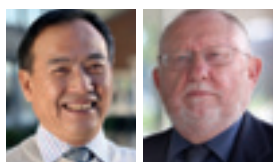
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common objective is to experiment with and demonstrate potential solutions through training "sustainability citizens" with appropriate competencies, adressing the talent shortage in rural communities.

Development of a Cooperative Ecosystem

The benefits of such challenge-oriented research and training for SCs development in higher education may be seen in a recent project in the poorer areas of China. This focussed on the development of a cooperative ecosystem to empower small farmers alleviate poverty. China is an instructive example in that nearly half (about 230 million) of the world's small farmer population live there. Since 2007, pro-cooperative government policies have been introduced to help farmers specialise and organize themselves for external markets.

There has also been a national campaign for poverty alleviation in the poorer areas of rural China (2015-2020) which involves a total of 832 counties, 128,000 villages and nearly 100 million people living below the national poverty line (about 2300-yuan RBM, or USD 1.9 per day). The campaign requested participation and contribution from stakeholders such as government agencies, state-owned enterprises, and public institutions, including universities, to eradicate rural poverty. It is claimed that this was achieved in terms of absolute rural poverty by 2020 (SCIF, 2021). This campaign provided an opportunity to observe and assess the development of sustainable competencies (SCs) among university staff and students.

The United Kingdom's Global Challenge Research Fund (GCRF), a funding programme to support innovative research to address challenges faced by developing countries (https://www.ukri.org/our-work/collaborating-internationally/global-challenges-research-fund/), awarded a pilot project to the University of Nottingham GCRF1 which focused on rural development in Sichuan, a poor, mountainous, and ethnically diverse region of south-west China.

The objective was to understand cooperative ecosystems in marginal areas of Sichuan, their impact on livelihoods, and the production organisation of small farmers. A further aim was to create a common platform for multiple stakeholders to improve coope-
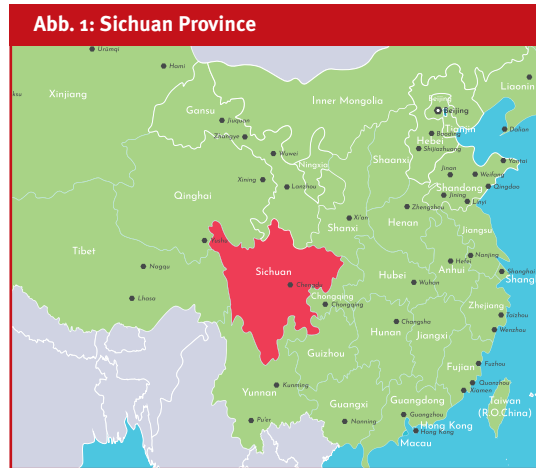

Abb. 1: Sichuan Province

rative ecosystems and support the development of SCs among participating students. Five research groups were established at Sichuan Agricultural University with themes enabling student participation and engagement with multiple stakeholders, especially farmers. This included potato industrialisation (commercialisation) for poverty alleviation; government intervention for cooperative development; pathways to cooperative leadership; rural finance for cooperative development; entrepreneurship for tourism development in rural ethnic minority areas (Wu et al. 2020).

Sustainability Competencies (SCs)

Sustainability competencies (SCs) are defined here as the knowledge, skills, values, and attitudes of students who intend to participate in or have already been involved in research, knowledge exchange, and voluntary service to alleviate poverty and sustain rural communities. According to the theme of the GCRF project, SCs contain four elements or dimensions:

- **Challenge oriented thinking:** to hear voices, needs, and opinions of local people and stakeholders about problems, common interests, and coping strategies.
- **A systematic approach:** to see the big picture of challenges and opportunities; the limitation of disciplinary perspectives, and the appreciation of local knowledge.
- **Communication competence:** to conduct meaningful, constructive, and effective communication

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Table 1: Student Participation in the GCRF Project

Participation Channel	Number	% of respondents
Research Group Meeting (offline/online)	42	71.2
Methodological Salon (online)	42	71.2
Field Research (online/offline)	36	63.0
Personal Supervision (online)	28	47.5
Total	148	250.8

Table 2: Motivation for Participation (multiple choice)

Motivation	% of respondents
Academic Horizon	84.7
Interdisciplinary Research	61.0
Field Research Methodology	55.9
Academic Writing	47.5
International Project Experience	40.7
Academic Network	32.2

Table 3: Impact of the Project on Individual Capacity Development (1-5 from low to high)

Competence Development Goals	Item selected by respondents (%)	Average Score	Rank
Question-oriented research and communication	79.7	4.15	1
Open mind in field research	74.6	3.95	2
Challenge-oriented thinking	71.2	3.90	3
Local knowledge and grassroots innovation	69.5	3.95	4
Representativeness in sampling	66.1	3.85	5
Ecosystem approach	66.1	3.81	6
Stakeholder engagement	59.3	3.69	7
Boundary and initial conditions of typical cases	59.3	3.63	8
Cooperatives for empowering small farmers	54.2	3.63	9
Academic research and writing skills	55.9	3.58	10

and dialogue about topics of common concern, among people from diverse backgrounds.

- **Professional competence:** for students to design theoretically informed practical projects for research and dissertation; and the development of writing and other communication skills for non-academic readers.

Survey Findings

Over a hundred students at all levels (undergraduate, postgraduate, and doctoral) from two Chinese agricultural universities (Sichuan Agricultural University and China Agricultural University) took part in the project. An online questionnaire (N=59) surveyed students' responses to their personal development of SCs and evaluation of the project.

Table 1 shows that most students joined at least two of these four activities – research group meeting (offline before the pandemic lockdown and online thereafter), methodological salon (all online), field research (online and offline combined), and personal supervision (online) for dissertation, or blog writing. Students who took part in research group meetings and academic seminars accounted for 71.2 percent each, followed by 61 percent in field research and 47.5 percent in papers/blogs writing. The survey shows that the motivations of students' participation in this project were varied and mixed. They include broadening one's academic perspective (84.7 percent), improving interdisciplinary methodology (61 percent), field research skills (55.9 percent), professional skills (47.5 percent), gaining international project experience (40.7 percent), and collaboration networking (32.2 percent).

This is shown by multiple choices about ten competence goals. Table 3 shows that respondents were positive about all ten competence goals, with an average score of 3.6 out of 5. Indeed, about 80 percent of respondents agreed that the project improved their competence in "question-oriented research and communications" significantly. This was ranked first with an average score of 4.15. The following competencies also achieved high scores (70 percent or above): "Open-mind in field research", "Challenge-oriented thinking", and "Importance of local knowledge and grassroots innovation". More than half of the respondents indicated a positive impact on their "academic writing" although less than a half of respondents experienced direct supervision of their research project. In general, the survey confirmed that the project made a significant contribution to the development of sustainability competencies (SCs) by the participating students.

Table 4: Which Participation Developed Competence Most Significantly (one for each, %)

Participation Competence	Challenge-Oriented Thinking	Ecosystem Approach	Communication Competence	Professional Competence
Group Meeting	32.2	20.3	27.1	20.3
Methodological Salon	13.6	16.9	50.8	18.6
Field Research	16.9	25.4	33.9	23.7
Supervision	25.4	10.2	20.3	44.1

We also asked the respondents to select the most influential from among four categories of the SCs: challenge thinking, ecosystem approach, communication skills, and professional skills. As Table 4 shows, participation in a research group meeting had an equal impact on SCs development across all four categories, while its influence on challenge thinking was slightly stronger than other items. Over 50 percent of respondents agreed that methodological training had an outstanding impact on improving interdisciplinary communication skills. The respondents who had taken part in field research said they had improved "communication skills" the most. Improvements in "professional competence" were significantly higher than those in other categories for students who had the opportunity of individual supervision of personal project design or academic writing (articles or blogs).

Respondents were also asked to evaluate the entire project according to four categories of SCs using the following rating: Hard to say, Pass, Good, Excellent. Table 5 shows that over 90 percent of the students rated: "Understand challenges affecting local regions" as Good or Excellent. It also ranked as the greatest improvement, followed by "Communication competence". Only 3.4 percent of students were unclear about their capability improvement after participating in the project, while over 71.2 percent rated the project as "Excellent", and 25.4 percent as "Good". This shows that outcomes in student competence development exceeded expectations.

Conclusion

This article draws attention to a novel approach by higher education to identifying sustainable competencies (SCs). Our conclusions are:

Table 5: Evaluation of the GCRF Project by SC Goal and Project (in total, %)

SC Development Goal	Hard to Say	Pass	Good	Excellent	Ranking
Challenge-Oriented Thinking	--	5.1	30.5	66.4	1
Ecosystem Approach	3.4	6.8	33.9	55.9	4
Communication Competence	--	3.4	30.5	66.1	2
Professional Competence	--	5.1	37.3	57.6	3
Overall Project	3.4	--	25.4	71.2	--

First, the evidence shows the need for prioritising and integrating challenge-oriented thinking into university research, curricula, and community engagement systems to ensure and enhance SCs for rural development in the developing world: the top priority of the United Nations' Sustainable Development Goals (SDGs).

Secondly, focusing on the challenging issues of rural China, this project demonstrated the feasibility of combining four channels (research grouping, methodological salon, field research, and joint-supervision) to address four SCs goals (challenge-oriented thinking, interdisciplinary perspective, cross-sectoral communication, professional competence). Most of these were delivered through online meetings because of the Covid-19 global pandemic and lockdown.

Thirdly, the possibility of achieving SCs goals was enhanced through the partnership of the University of Nottingham and two Chinese Agricultural Universities with multiple stakeholders with an emphasis on farmers' participation and empowerment. However, in future, a more specific definition of what is required by such a partnership is needed. This needs to be much more sensitive to the local conditions and expertise.