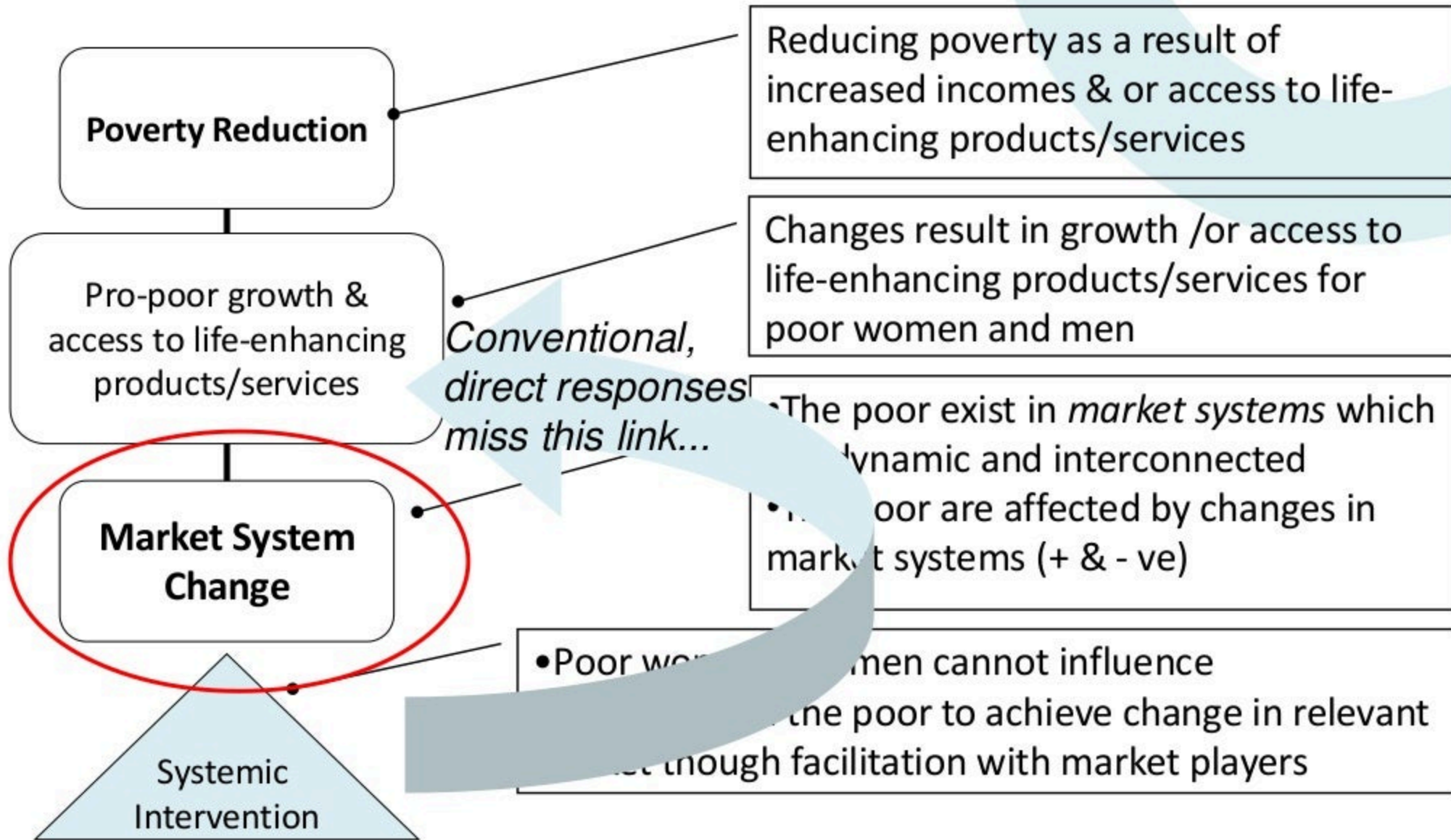


Proof of concept for the use of wearable sensors to monitor women and men's workload and mobility in Indonesian agricultural communities

Tim Stewart, Rachel Davey, Giulia Salmaso,
Dipo Pangestu & Sander van Berlo



Market systems development



The challenge of reaching women in MSD

- Economic advancement
- Access to opportunities
- Access to assets
- ~~Poverty Reduction~~
- ~~Decision making~~
- **Manageable workload**

Pro-poor growth &
access to life-enhancing
products/services



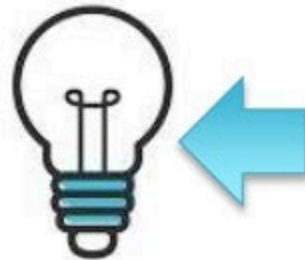
Systemic
Intervention

- MSD programmes work in partnership with third parties (private & public sector) – not directly with farming HHs
- Impact is dependent on the actions of these partners
- Therefore challenging to observe impact on women and men of a change in their livelihood – e.g. on work-load

Improving access to irrigation for small rice farmers

- DFAT Australia-Indonesia Partnership for Rural Development
- Irrigation component aimed to improve access for 10,000 smallholders & increase incomes by 60%
- Worked with rice millers & irrigation entrepreneurs
- Improved infrastructure & service provision
- From 1 to 2 or 3 rice seasons – increasing yields & incomes





Aims of the research

to examine the feasibility of using activity *wearables* and smartphones to quantify relative workloads and activity patterns of women and men rural farmers in Indonesia.



Innovative approach



Test the acceptability and adherence of participants using Garmin wearables and smartphones daily over a period of 5-months.

Develop and implement a protocol for data collection e.g. to monitor workload and activity patterns throughout the agricultural cycle e.g. planting, harvesting.

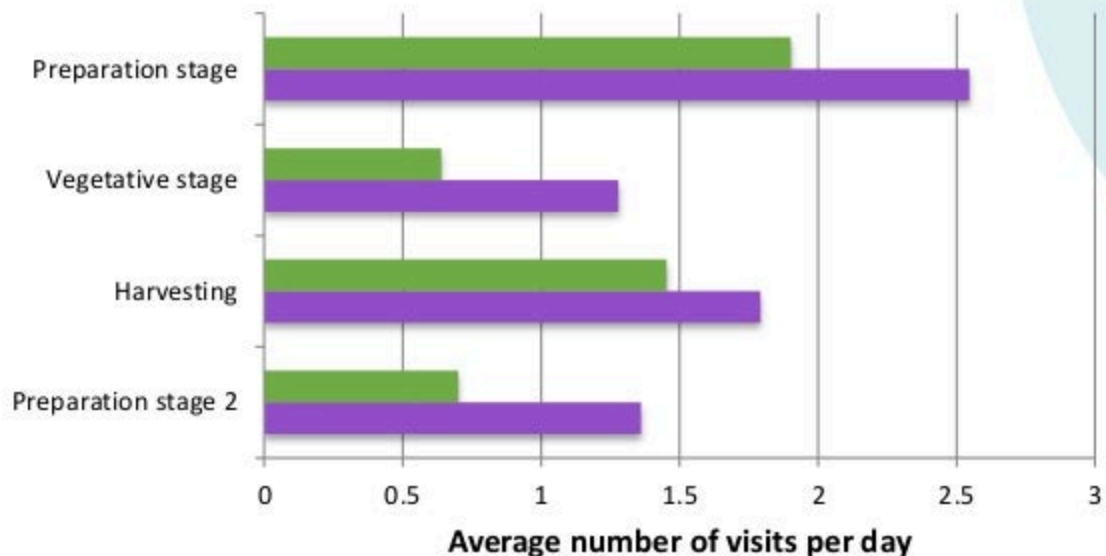
Develop and test data analytics and to compare with existing methodologies.

Data collection

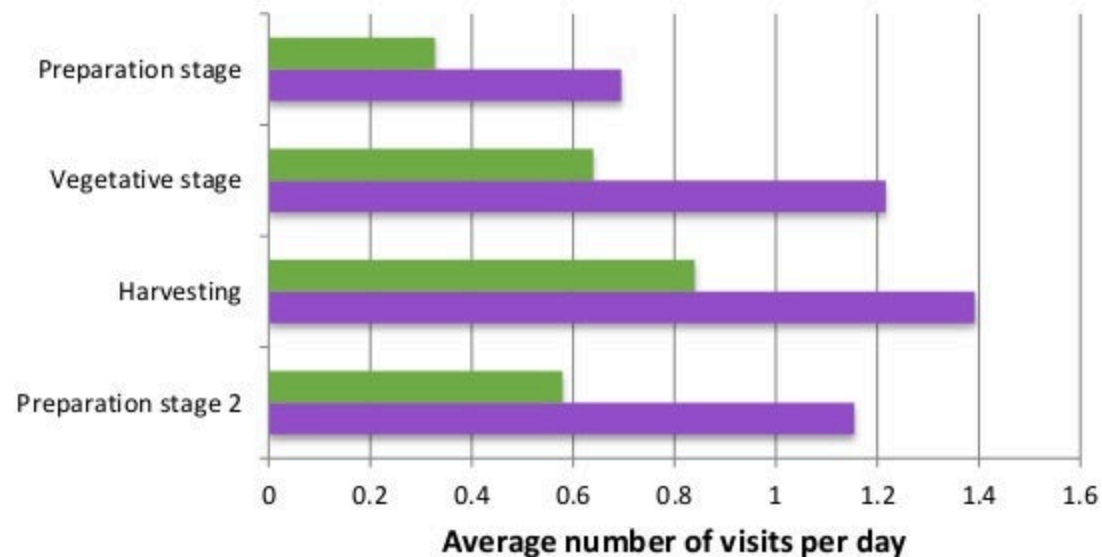


Results – mobility

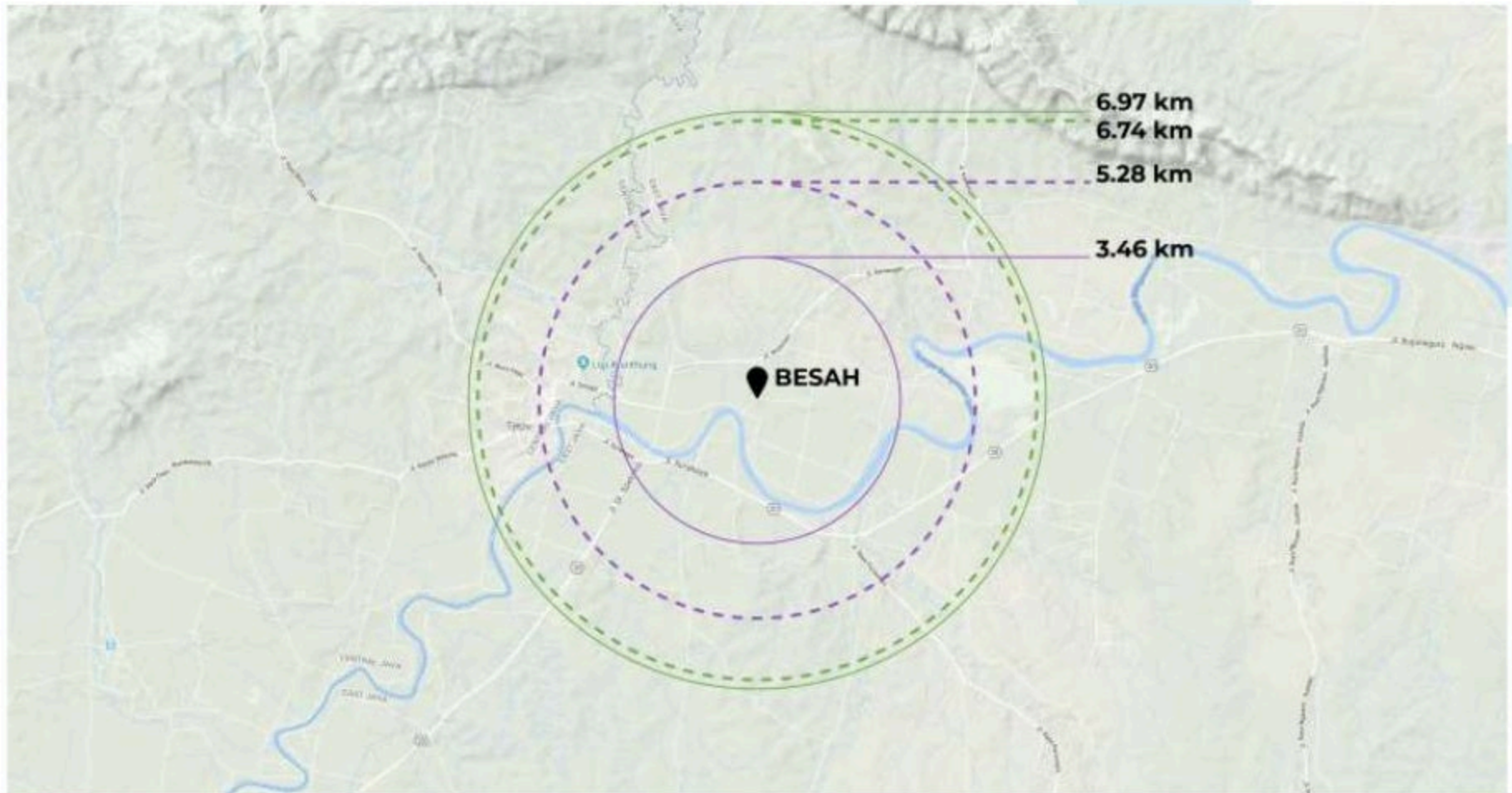
Farm



Home

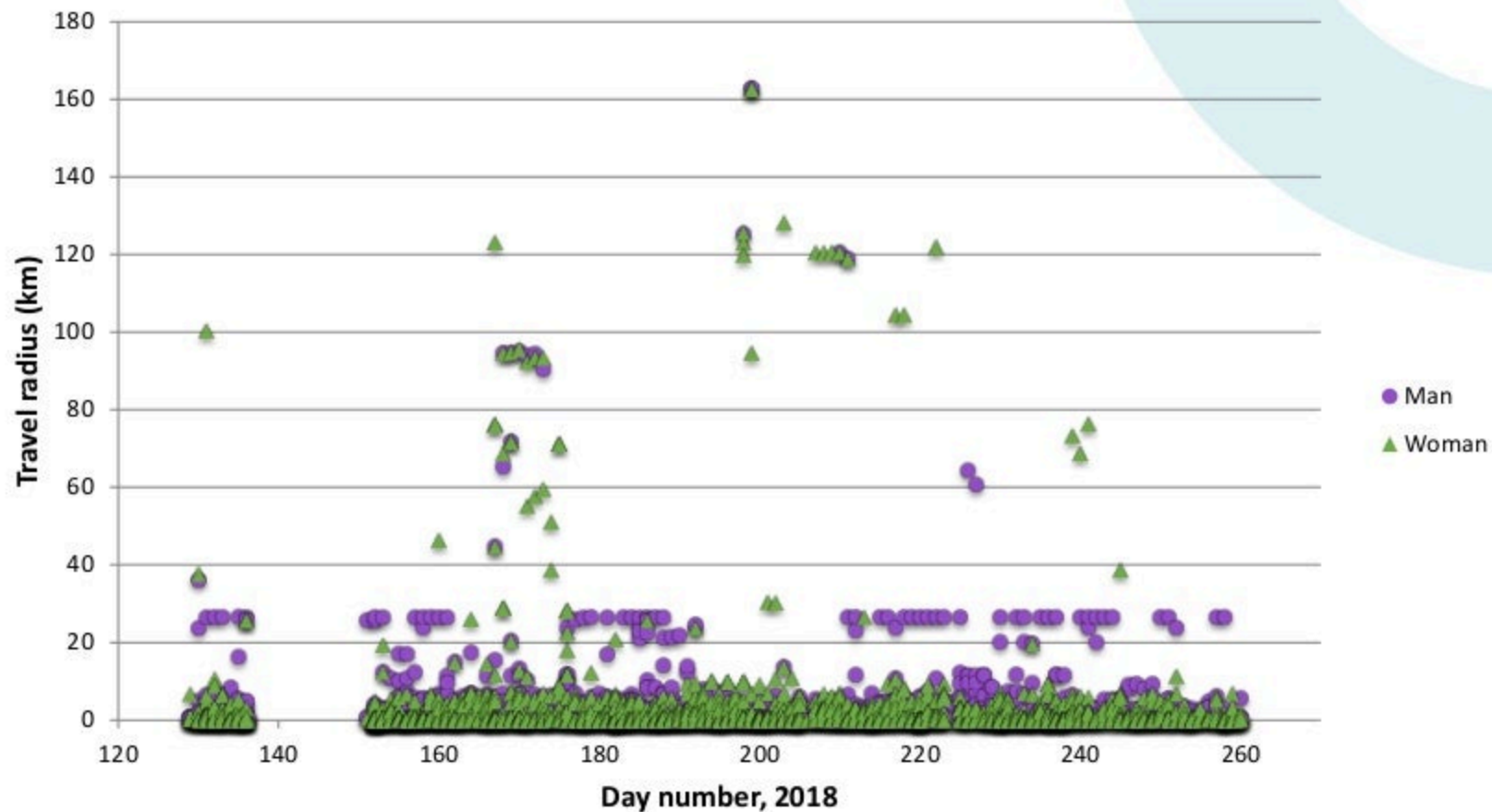


Results – mobility



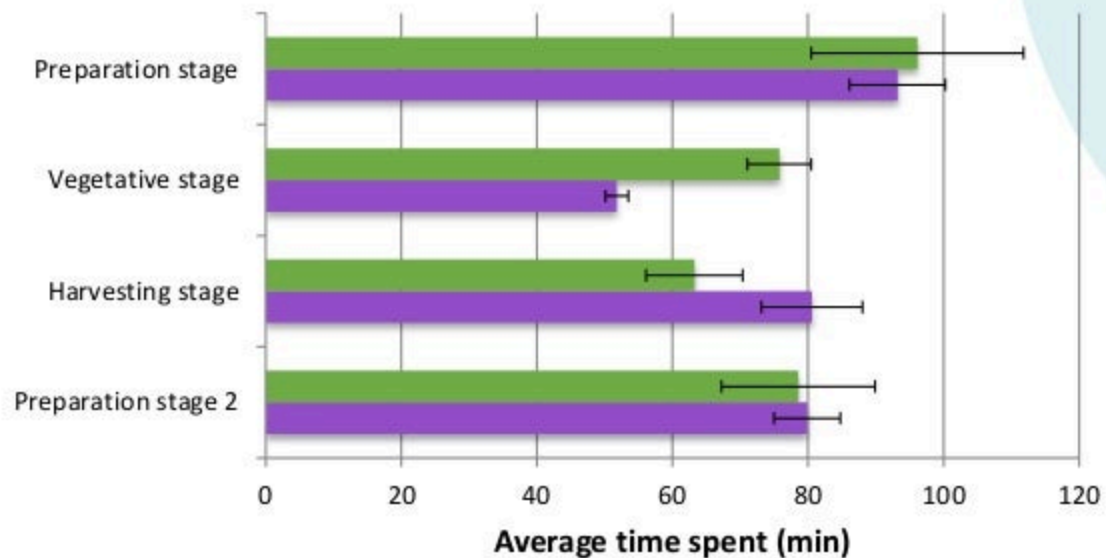
Results – mobility

Travel radius, all stages

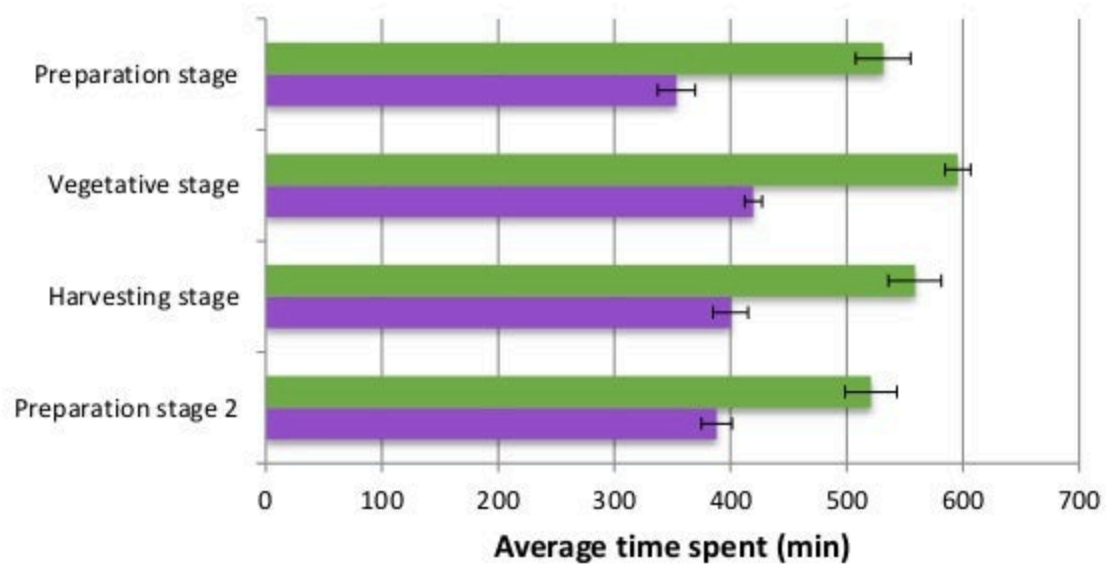


Results – average time spent

Farm

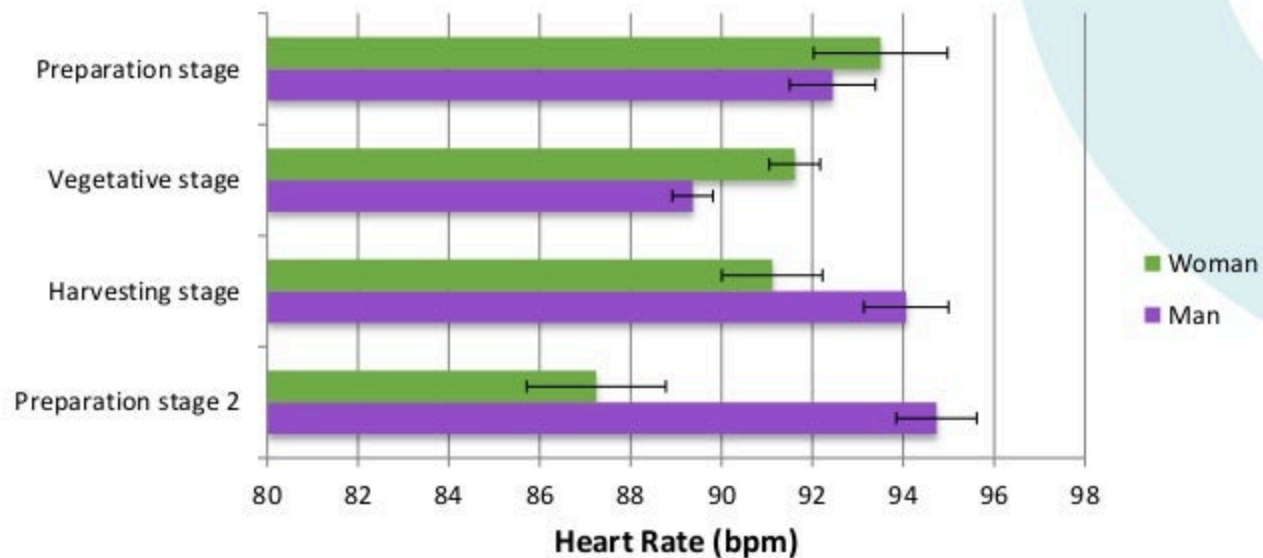


Home

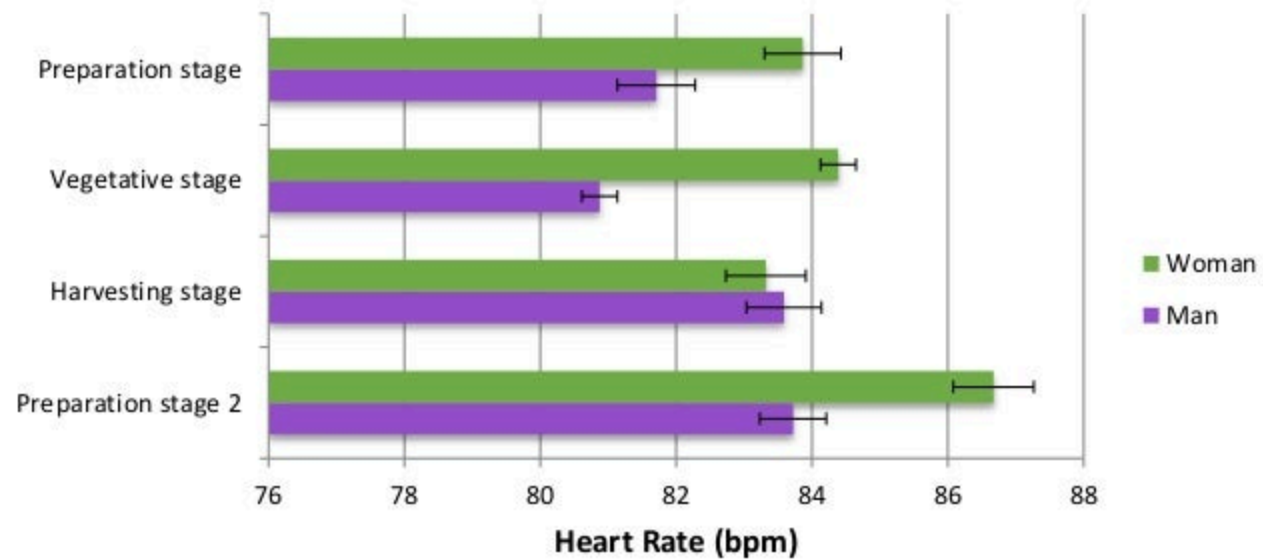


Results – workload

Farm

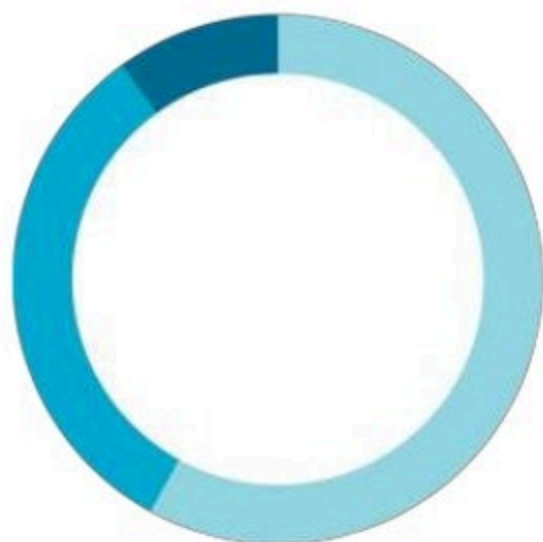


Home



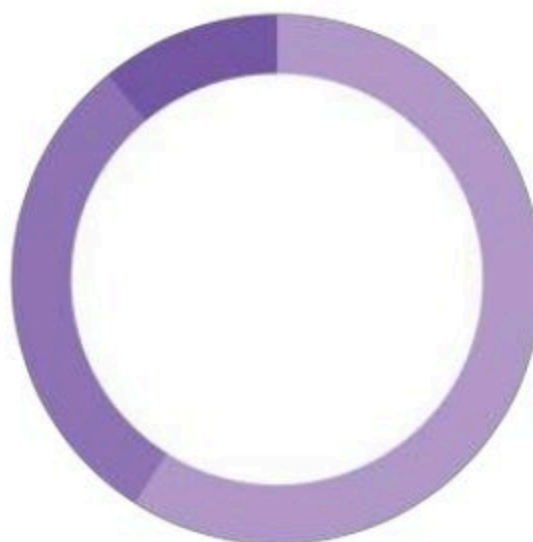
Results – workload

TOTAL



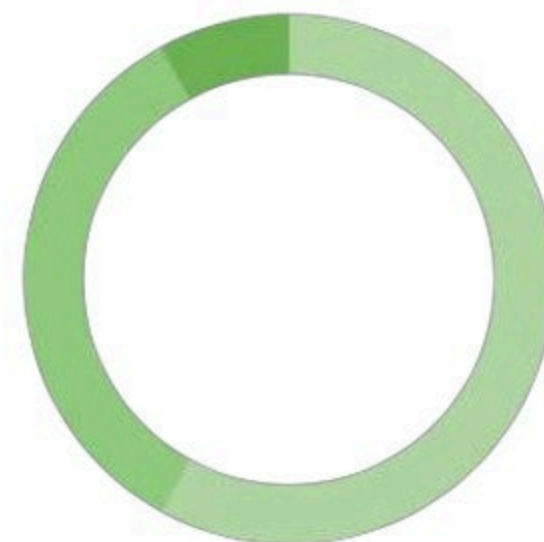
Light intensity 58%
Moderate intensity 32%
Vigorous intensity 10%

MEN



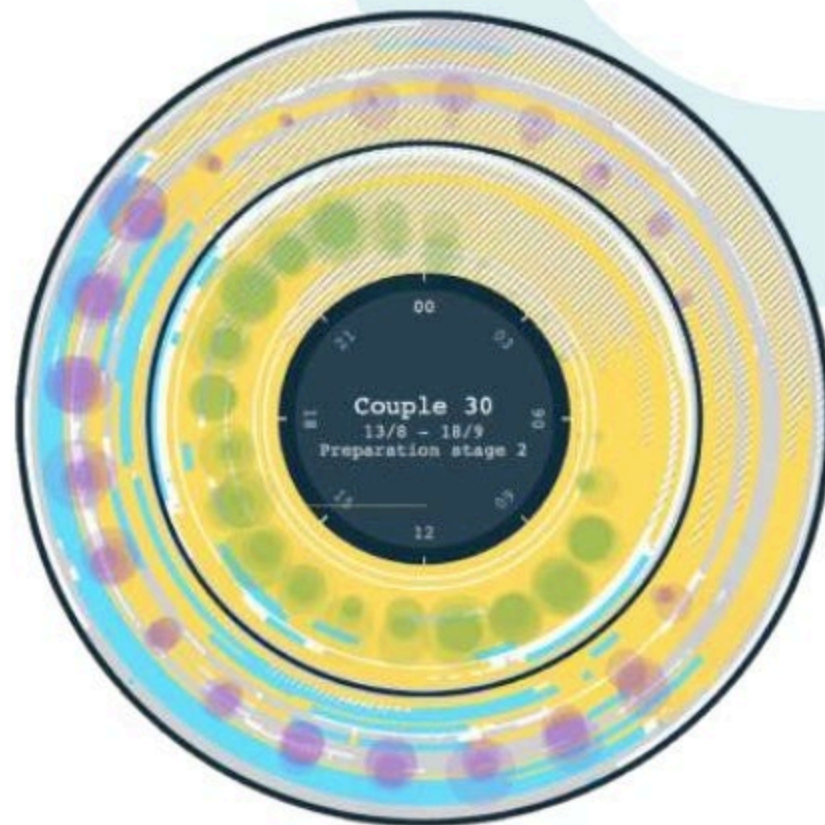
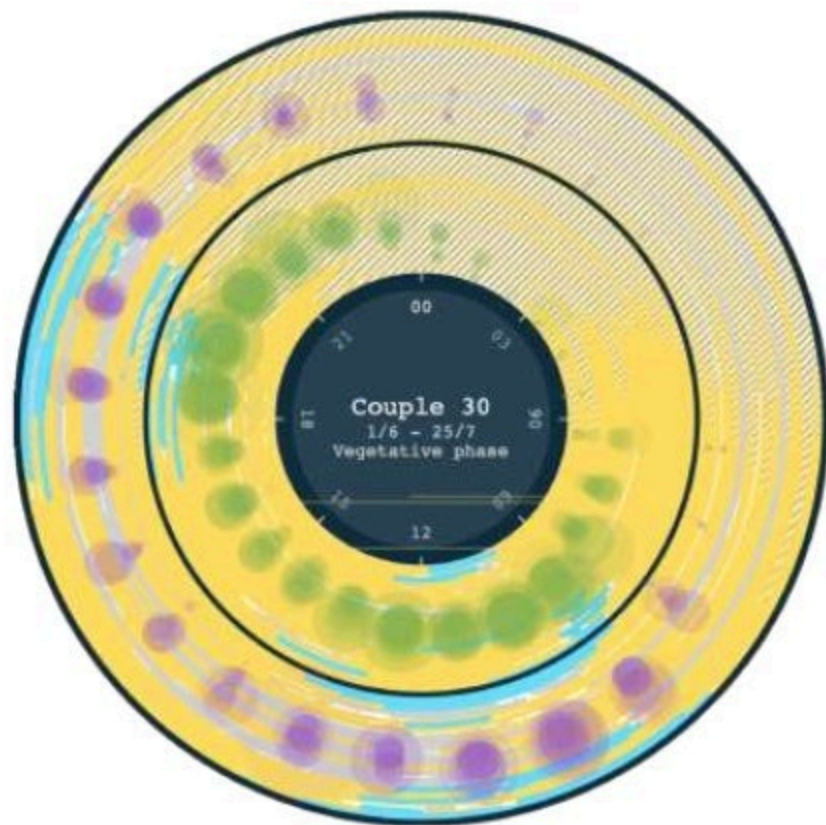
Light intensity 59%
Moderate intensity 30%
Vigorous intensity 11%





WOMEN



Light intensity 58%
Moderate intensity 34%
Vigorous intensity 8%

Results – trend analysis



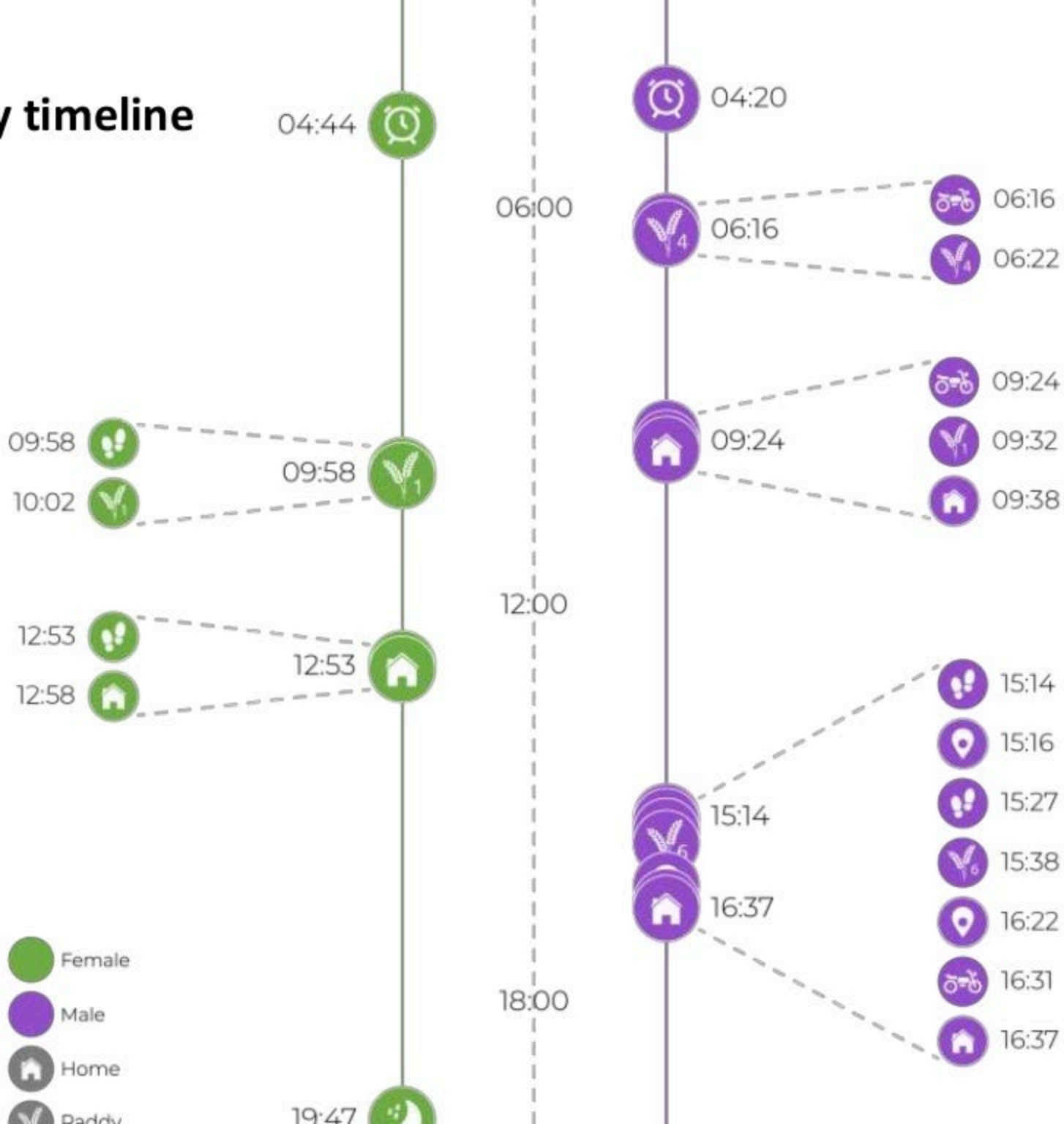
Farm  Home  Other  Male  Female 

Results – daily timeline

A day in the life of:

Couple 17

2018-05-26



Conclusions

Limitations comparing with programme's standard survey – but confirmed overall perceptions (except for mobility) helpful for improving design of future surveys.

Observed the “triple burden”.

Successfully demonstrated the potential of measuring workload objectively, and activity patterns of men and women rice farmers.

Use of wearable devices, GPS tracking and smartphones has potential to monitor the impact of changes in agricultural practice or policy at the individual, household or community level.

