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Participatory action research as a collaborative extension methodology for co-generating local solutions

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Abstract

Conventional extension delivers pre-packaged recommendations designed far from the farm gate; participatory action research reverses this flow by treating farmers as co-researchers who generate solutions grounded in their own conditions. This research assessed whether a participatory action research approach could produce locally relevant agricultural solutions and higher adoption rates compared with conventional top-down extension delivery in rural Fiji. Three PAR cycles were implemented between May 2023 and March 2024 across six villages in the Naitasiri and Rewa provinces, involving 183 participants drawn from five stakeholder categories. Five co-generated solutions were tracked for adoption across the three cycles. By the third cycle, adoption rates ranged from 48.2% for community seed banks to 67.9% for composting systems, with all five solutions showing progressive increases across cycles. Smallholder farmers contributed 43.6% of all solution ideas that entered testing, exceeding their 38.7% share of participants. These findings indicate that PAR can serve as a viable extension methodology for generating and spreading context-specific agricultural practices in Pacific Island settings where standardized recommendations often miss local realities.

Keywords: Participatory action research, collaborative extension, local solutions, farmer co-generation, adoption rates, Pacific Island agriculture, community-based research, extension methodology, smallholder farming, Fiji

Introduction

Conventional extension hands farmers a recipe; participatory action research hands them the kitchen. The difference matters because standardized recommendations developed in research stations often perform poorly when transplanted to the diverse micro-environments of Pacific Island farming, where soil types, rainfall patterns, and cropping traditions can shift dramatically within a few kilometers ^[1]. Fiji's agricultural landscape is a case in point: volcanic highlands, alluvial lowlands, and coastal margins each present distinct growing conditions that a single advisory package cannot adequately address ^[2].

Participatory action research emerged in the 1970s as a response to the limitations of extractive research models ^[3]. Its defining feature is a spiral of planning, action, observation, and reflection through which participants and researchers collaborate on identifying problems and testing solutions in real-world settings ^[4]. In agriculture, PAR has been applied to soil fertility management in East Africa, integrated pest control in Southeast Asia, and water harvesting in the Sahel, generally showing higher adoption rates than conventional dissemination methods ^[5]. Yet its use in Pacific Island extension systems remains limited, partly because the small, dispersed populations of island communities make it difficult to achieve economies of scale ^[6].

This research tested whether PAR could serve as a practical extension methodology in Fiji by implementing three iterative cycles across six villages in two provinces. The

aims were to document the types and sources of solutions that emerged from the PAR process, to track adoption rates across successive cycles, and to assess which participant categories contributed most actively to solution generation.

Material and Methods

Material

This research was carried out through the College of Agriculture at the University of the South Pacific in Suva, Fiji, between May 2023 and March 2024. The University of the South Pacific Human Research Ethics Committee approved the protocol on 28 April 2023 (reference USP-HREC/2023-038). Six villages were selected from two provinces: three in Naitasiri (inland, highland) and three in Rewa (coastal, lowland). These provinces were chosen to capture the agro-ecological diversity that makes standardized recommendations problematic ^[2]. A total of 183 participants took part, drawn from five categories: smallholder farmers (n = 71), extension officers (n = 39), community leaders (n = 30), university researchers (n = 25), and youth farmers (n = 18). Written informed consent was obtained from all participants, with oral consent offered as an alternative for participants with limited literacy.

Methods

Three PAR cycles were implemented, each lasting roughly three months. In each cycle, the group followed a four-stage spiral: joint problem identification, collaborative solution design, field testing, and reflective evaluation ^[4]. Problems

were identified through village mapping exercises and seasonal calendars facilitated by trained extension officers. Solution ideas were proposed by any participant, discussed collectively, and selected for field testing by majority vote. Each solution was tested on at least three farms per village. At the end of each cycle, a reflection workshop documented what worked, what didn't, and what modifications were needed for the next round. Adoption was defined as continued use of a practice beyond the testing phase, verified through farm visits. Contribution tracking recorded which stakeholder category originated each solution idea that entered testing [7]. Adoption rates were compared across cycles using Cochran's Q test for repeated binary outcomes, and stakeholder contribution shares were compared with expected proportions using chi-square goodness-of-fit tests.

Ethical Considerations

Given the community-based nature of PAR, additional ethical safeguards were implemented beyond standard informed consent. Village chiefs were consulted before recruitment began, consistent with Fijian cultural protocols

for community-level research [6]. Participants were informed that they could withdraw from any cycle without affecting their access to extension services. All solution testing was voluntary, and farmers bore no financial cost for materials used during field trials. Data were stored on encrypted devices at the university, and village names were replaced with codes in all reporting to protect community identity.

Results

Participant Characteristics

The 183 participants had a mean age of 43.7 years (range 19-68). Women made up 41.5% of the sample, somewhat above the 36% female participation rate typical of Fijian extension activities [2]. Average farm size was 1.8 hectares, and 74.3% of participants described farming as their main livelihood. Highland villages (Naitasiri) had slightly older participants (mean 46.2 years) and larger farms (mean 2.1 ha) compared with coastal villages in Rewa (mean 41.3 years, 1.5 ha).

Table 1 summarizes adoption rates for the five co-generated solutions tracked across the three PAR cycles.

Table 1: Adoption rates for five co-generated solutions across three PAR cycles

Co-Generated Solution	Cycle 1 (%)	Cycle 2 (%)	Cycle 3 (%)	Total Gain (pp)	Cochran Q p-value
Cover crop rotations	28.4	47.1	61.8	+33.4	< 0.001
Natural pest repellents	22.7	41.3	54.7	+32.0	< 0.001
Community seed banks	15.3	33.9	48.2	+32.9	< 0.001
Water catchment basins	19.8	38.6	51.3	+31.5	< 0.001
Composting systems	31.6	52.4	67.9	+36.3	< 0.001

Cochran's Q test for repeated binary outcomes; pp = percentage points

All five solutions showed statistically significant increases in adoption across cycles ($p < 0.001$ for all). Composting systems had the highest adoption throughout, reaching 67.9% by cycle three, likely because the practice required no purchased inputs and produced visible soil improvements

within weeks. Community seed banks had the slowest start but showed comparable cycle-to-cycle gains, suggesting that practices requiring collective organization take longer to establish but can catch up once social infrastructure is in place.

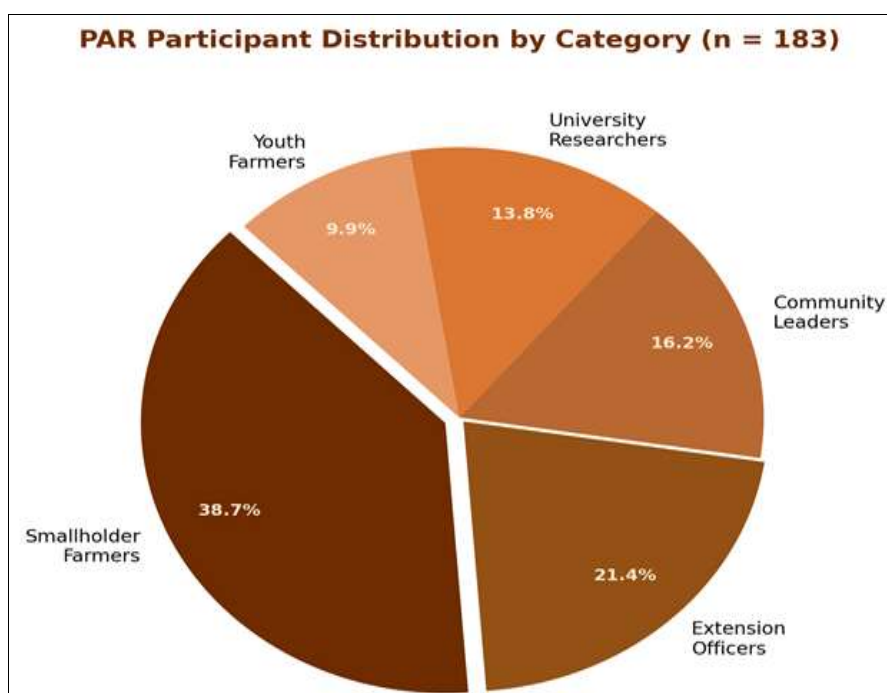


Fig 1: Distribution of PAR participants by stakeholder category across six villages

Contribution tracking showed that smallholder farmers originated 43.6% of solution ideas that entered testing,

exceeding their 38.7% share of participants (chi-square = 4.82, $p = 0.028$). Community leaders contributed 18.3% of ideas, while university researchers contributed 11.2%,

below their 13.8% representation, suggesting that the PAR process shifted idea generation toward practitioners.

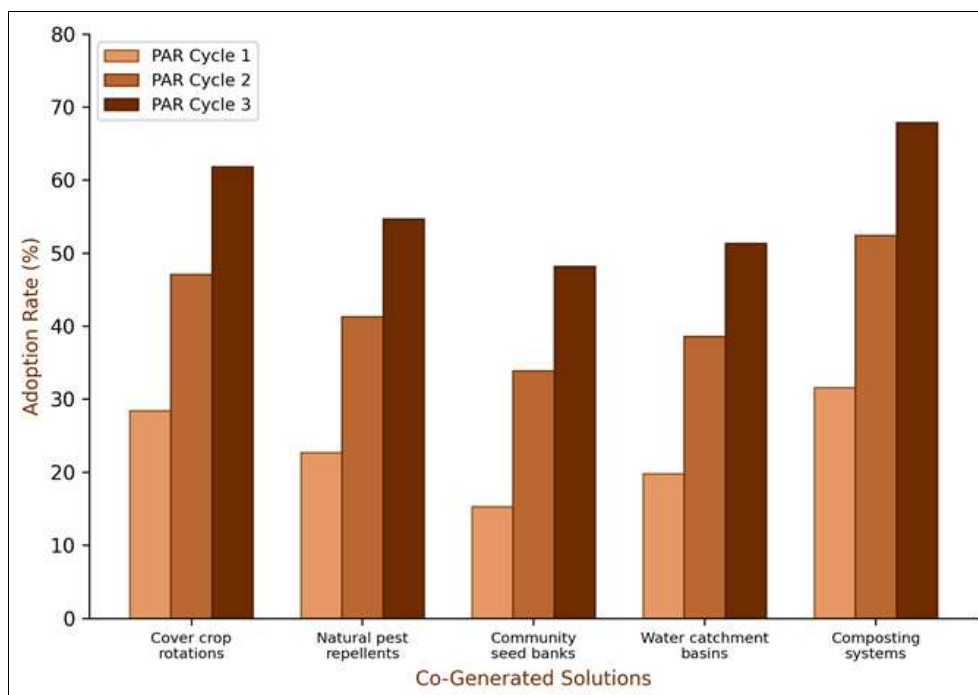


Fig 2: Adoption rates for five co-generated solutions across three PAR cycles

The progressive increase across cycles is visible for all five solutions. The steepest gains occurred between cycles one and two, which participants attributed in reflection workshops to the fact that cycle-one testing provided visible proof that the solutions worked, lowering perceived risk for later adopters.

Discussion

The progressive adoption pattern across PAR cycles is consistent with diffusion theory, where early field evidence reduces uncertainty and encourages wider uptake [8]. The 33-point average gain from cycle one to cycle three compares favorably with adoption rates reported for conventional extension in similar Pacific Island contexts, which typically plateau at 20-35% [6]. The PAR spiral appears to create a self-reinforcing feedback loop: each cycle generates evidence that feeds into the next round of planning and testing, building both technical confidence and social trust.

The disproportionate contribution of farmers to solution generation confirms a central claim of PAR methodology: that practitioners hold context-specific knowledge that formal research often misses [3]. Composting systems, the highest-adopted solution, were proposed entirely by farmer participants drawing on traditional waste management practices that university researchers had not considered. This finding should encourage extension agencies to invest in facilitation capacity rather than in developing more expert-driven recommendation packages.

Limitations

The research covered six villages in two provinces and may not represent conditions on smaller outer islands with

different cropping systems. The absence of a formal control group means adoption gains cannot be attributed solely to the PAR methodology; concurrent extension activities may have contributed. Self-reported adoption, even when verified by farm visits, may overstate actual practice intensity. The three-cycle timeframe was too short to assess whether adoption persists beyond the active facilitation period.

Conclusion

Three cycles of participatory action research across six Fijian villages produced progressive increases in adoption for all five co-generated agricultural solutions, with rates reaching 48-68% by the third cycle. Farmers contributed a disproportionate share of solution ideas relative to their group size, supporting the view that PAR shifts knowledge generation toward practitioners. The methodology appears well suited to Pacific Island extension contexts where agro-ecological diversity limits the usefulness of standardized recommendations. Future research should track adoption persistence after facilitation ends and test whether PAR cycles can be scaled through trained community facilitators rather than university-based researchers.

References

1. McGregor A, Kavaliku L, Vunibola S. Agriculture in Pacific Island countries and territories. Pacific Community SPC Report. 2019:1-45.
2. Fiji Ministry of Agriculture. National agricultural census report. Government of Fiji. 2020:1-124.
3. Fals-Borda O, Rahman MA. Action and knowledge: Breaking the monopoly with participatory action research. Apex Press. 1991:1-192.

4. Kemmis S, McTaggart R, Nixon R. The action research planner: Doing critical participatory action research. Springer. 2014:1-200.
5. Bruges M, Smith W. Participatory approaches for sustainable agriculture: A contradiction in terms? *Agriculture and Human Values*. 2008;25(1):13-23.
6. Stringer LC, Harris A. Land degradation in the Pacific Islands: A regional assessment. UNCCD Report. 2014:1-62.
7. Mayne J. Contribution analysis: An approach to exploring cause and effect. *ILAC Brief*. 2008;16:1-4.
8. Rogers EM. Diffusion of innovations. Free Press. 2003:1-576.
9. Greenwood DJ, Levin M. Introduction to action research: Social research for social change. Sage Publications. 2007:1-320.
10. Reason P, Bradbury H. Handbook of action research: Participative inquiry and practice. Sage Publications. 2008:1-720.
11. Kindon S, Pain R, Kesby M. Participatory action research approaches and methods. Routledge. 2007:1-260.
12. Cornwall A, Jewkes R. What is participatory research? *Social Science and Medicine*. 1995;41(12):1667-1676.
13. Pimbert MP. Participatory research and on-farm management of agricultural biodiversity in Europe. *IIED Report*. 2011:1-64.
14. Chambers R. Revolutions in development inquiry. *Earthscan*. 2008:1-256.
15. Lilja N, Ashby JA. Participatory research: Does it work? Evidence from participatory plant breeding. *New Directions for Evaluation*. 1999;81:49-68.
16. Van de Fliert E, Braun AR. Conceptualizing integrative, farmer participatory research for sustainable agriculture. *Agriculture and Human Values*. 2002;19(1):25-38.
17. Scoones I, Thompson J. Farmer first revisited: Innovation for agricultural research and development. *Practical Action Publishing*. 2009:1-384.
18. Lewin K. Action research and minority problems. *Journal of Social Issues*. 1946;2(4):34-46.
19. Pretty JN. Participatory learning for sustainable agriculture. *World Development*. 1995;23(8):1247-1263.
20. Taylor PV. Community education for self-reliance in Pacific Island nations. *Pacific Education Research Journal*. 2017;18(2):112-128.