

**Impact Evaluation of Agricultural Research in Papua,  
Indonesia Using the Sustainable Livelihood Framework**

By

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the requirements for the degree of  
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## **Dedication**

*This thesis is dedicated to my sons: **Rizki Caesario Maulana** and **Muhammad Kevin Andra** who have been providing me with never ending aspirations and inspirations. Nuhun Rob, Alhamdulillah...*

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*May Allah SWT bless you all .....,*

## **Declaration**

I, Sukendra Mahalaya, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy from the Faculty of Sciences, The University of Adelaide, Australia, is completely my own work except where otherwise referenced or acknowledged.

This work has not been submitted for qualifications at any other academic institutions.

Roseworthy, 11<sup>th</sup> July 2010

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## Abstract

Papua presents Indonesia with an intractable development challenge; while the province is the source of great national wealth from its extractive industries, 41% of population remains below the poverty line. Accordingly, the Papuan provincial government, with help from international donors, is enhancing community development through promoting a sustainable livelihoods strategy based on agriculture. During 2001-2006, the Australian Centre for International Agricultural Research funded a research project to improve the sweetpotato-pig systems of the Dani people in the Baliem Valley. This study evaluates the impact of this project on Dani livelihoods, and examines the value of the Sustainable Livelihood (SL) framework for the purpose of this evaluation.

Surveys with semi-structured group interviews and other Participatory Rural Appraisal techniques collected primary bio-physical and socio-economic data, both quantitatively and qualitatively. ‘Before-’ and ‘After-project’ information was collected from project participants (n = 38) and a comparison group (n = 190). The survey sample was determined using the propensity score matching method. A double difference statistical method was used to quantify the impact of the project in terms of relative changes in livelihood assets between project and comparison groups. A similar method was used to establish qualitative differences in vulnerability factors associated with sweetpotato and pig production. *Silis* – the fundamental social unit of the Dani community – was used as a unit of analysis.

Impacts of the research project on the 5 categories of Livelihood Assets include: 1) improved sweetpotato genetic diversity, higher yields, crop production efficiency and cycles and resilience against environmental stress, and less dependence on natural resource products for income (natural assets); 2) improvements in physical *sili* goods and the adoption of the pigsty-*laleken* technology (physical assets); 3) improvements in education and sweetpotato-pig husbandry skills (human assets); 4) improvements in social cohesion through the formation of *sili* organisations (social assets); 5) and improvements in the capacity of producing more sweetpotatoes and pigs, and cash incomes (financial assets). Moreover, the vulnerability factors of sweetpotato and pig production such as sweetpotato yields and pig diseases is reduced by *sili* participation in the project.

Drawing on these impacts the study proposes a number of recommendations in the context of the “policies, institutions, and processes” component of the SL framework. The proposed policies include extension of the improved sweetpotato-pig systems through farmer-to-farmer extension programmes, efficient sweetpotato-pig husbandry technical assistance from local institutions, the formation of *sili* organisations in every village, equitable agricultural training opportunity for both Dani men and women, wider access to loans from local financial institutions, on-farm multiplication of new sweetpotato cultivar cuttings, and regulations to control marauding pigs. Meanwhile, the institutions that need closer facilitated collaboration are the Jayawijaya Extension, Agricultural, Livestock, and Co-operative Offices (government organisations); and the World Vision Indonesia and the Jayawijaya Institute for Customary Discussion (non-government organisations). Furthermore, wider participation of *silis*, and the provision and continuation of training for local technical staff within the institutions should be encouraged.

The use of the SL framework elsewhere has been either as an analytical tool, as a tool impact assessment, or an overview to guide development. In this study, all these values of the SL framework are used to evaluate the impact of the project. As such it offers a more comprehensive impact evaluation with more quantification of impacts than other similar studies.

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## List of Acronyms

ABS	Agricultural Bank of Sudan	JLO	Jayawijaya Livestock Office (= DISNAK)
ACIAR	Australian Centre for International Agricultural Research	KIPPK	<i>Kantor Informasi Penyuluhan Pertanian dan Kehutanan</i> (= JEO)
ADB	Asian Development Bank	LA	Livelihood Assets
AIAT	Assessment Institute for Agricultural Technology (= BPTP)	LLI	Local Labour Institute (= BKD)
AP	After Project	LO	Livelihood Outcomes
AUSAID	Australian Agency for International Development	LS	Livelihood Strategies
BC	Benefit Cost	MMI	Metemamen Microfinance Institution
BKD	<i>Badan Kepegawaian Daerah</i> (=LLI)	NPV	Net Present Value
BP	Before Project	PG	Project Group
BPTP	<i>Balai Pengkajian Teknologi Pertanian</i> (= AIAT)	PIP	Policies Institutions Processes
CG	Comparison Group	PRA	Participatory Rural Appraisals
CGIAR	Consultative Group on International Agricultural Research systems	PSM	Propensity Score Matching
CIP	International Potato Center	RoI	Returns on Investment
CRS	Catholic Relief Services	SFR	Soil Fertility Replenishment
DDI	Double Difference Impact	SL	Sustainable Livelihoods
DFID	Department for International Development	SP	Sweetpotato
DISKOP	<i>Dinas Koperasi</i> (= JCO)	ToT	Training of Trainers
DISNAK	<i>Dinas Peternakan</i> (= JLO)	UN	United Nations
DISTAN	<i>Dinas Pertanian</i> (= JLO)	UNDP	United Nations Development Programmes
FFS	Farmer Field School	USAID	United States Agency for International Development
FtF	Farmer-to-Farmer	VC	Vulnerability Context
IAARD	Indonesian Agency for Agricultural Research and Development	WB	World Bank
IDRC	International Development Research Centre	WCED	World Commission on Environment and Development
IDS	Institute of Development Studies	WVI	<i>Wahana Visi Indonesia</i>
IFAD	International Fund for Agricultural Development		
IRR	Internal Rate of Return		
JAO	Jayawijaya Agricultural Office (=DISTAN)		
JCO	Jayawijaya Cooperative Office (= DISKOP)		
JEO	Jayawijaya Extension Office (=KIPPK)		
JGO	Jayawijaya Government Office (= PEMDA)		
JICD	Jayawijaya Institute for Customary Discussion		