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A systems approach mapping of primary forest residues supply chain for sustainable production of bioenergy in Malawi

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Variations overtime in the supply chain of primary forest residues have the potential to exacerbate sustainability challenges in bioenergy production from the residues. Understanding the sources and causes of these variations along the supply chain can enable formulation of policy frameworks that can enhance availability and steady supply of the residues for sustainable production of bioenergy. This paper presents a systems approach mapping of primary forest residues supply chain from Viphya forest plantations in northern Malawi to elucidate potential sources of variations overtime in the residues supply chain. Management and harvesting systems and technologies applied in the plantations, residues production, post harvesting handling and utilisation were assessed from plantations management reports and from onsite material balance of timber production processes. Over extraction of mature stand, delayed replanting, coupled with high death rate of replanted trees resulted in depletion of the plantations in 15 years before maturity age (25 years) of first set of replanted trees, which in turn led to intermittent supply of the residues. Key sustainability challenges along the supply chain categorised as managerial, economic, environmental, social and technical logistics are presented in the paper. Stakeholder analysis along the supply chain revealed the power/influence, interests and concerns of the stakeholders in the value chain that provide opportunities for management innovations in the supply chain for sustainable production of bioenergy from the residues. An integrated forest plantations management and bioenergy production framework can allow sustainable harvesting of mature stand for timber and bioenergy production from primary forest residues from Viphya plantations.

Biography

Maxon L Chitawo is a PhD student at Stellenbosch University in the Process Engineering department. He comes from Malawi, where he is an Academic Member of Staff at Mzuzu University in the Department of Energy Studies where he also Heads the Bioenergy Systems Research Group. He did his Bachelor's degree in Mechanical Engineering at The Polytechnic, University of Malawi from 1991 to 1996 and Master's degree in Renewable Energy Systems Technology at Loughborough University in United Kingdom from 2006 to 2007. His research interest is in bioenergy systems focussing on sustainability issues.

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