

Pastoralism and the provision of non-marketed goods and services: a systematic review

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Keywords: Pastoralism, NCP's, Global change, Socio-ecological systems

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Intro:

Traditional animal production systems such as pastoralism in all its forms have existed for thousands of years in various parts of the world (Starrs 2018). Today pastoralism can be found around the world, on every continent, and is still economically vital in many rural regions, with an estimated 120 million pastoralists in the world today (Díaz et al. 2015; Kgosikoma, Mojeremane, and Harvie 2012; Krätli et al. 2013; Ouedraogo and Davies 2016). Pastoral systems have strongly influenced the landscapes in which they developed. In many parts of the world, pastoralism and the landscape share a symbiotic relationship. Pastoralists shape the landscape and the landscape shapes the pastoralists, through the use, creation, protection and, in some cases, degradation of natural resources. This relationship has been largely ignored by industrial agricultural research, policies and market to date, with pastoralism being relegated to marginal land and the socio-ecological complexity of the systems which have been created being largely not acknowledged or understood (Krätli and Schareika 2010). In recent times, pastoral systems have been increasingly abandoned or marginalised in place of more intensive forms of agriculture (Rueff and Rahim 2016). Pastoralism is today found in rural areas where the land is less suitable for more intensive forms of agricultural production, and an ageing pastoral population and the emergence of economic alternative for pastoral households have led to wide-scale land use changes and abandonment in many parts of the world. It can be argued that pastoral systems create public goods or beneficial externalities, as it plays a keystone role in landscape conservation, cultural identity and social cohesion. Pastoralism has played a defining role in creating some of the most diverse and unique ecosystems in the world, and that the decline of pastoralism has led to a decline in landscapes but also social cohesion, indigenous knowledge loss and a loss of positive externalities (Starrs 2018). We will argue that pastoralists have a deep history of innovation as they live and work with uncertainty as an accepted part of their livelihoods, as such, innovation and adaptability are trademarks of their system (Krätli and Schareika 2010). Pastoralists, as part of this innovation, are specialists in the creation and utilisation of ecosystem services, many of which are of great benefit to society as a whole at no additional price to the market.

Methods:

A comprehensive analysis of the relationship between pastoralism and nature's contribution to people's (NCP's) (Díaz et al. 2018) was missing in the literature. NCP's are the evolution of the ecosystem services idea and it is designed to acknowledge the views of biological, social and economic sciences. In order to address this gap, a systematic review of pastoral systems (NCP's) and society was performed. An operator string was created (past* OR graz* OR agri OR extens* OR semi-natural OR grasslands AND livestock AND ecosystem-services OR environmental-services OR socio-eco* OR ltk OR lek AND NOT intensive) and used in the Scopus database on 19-09-2018. Only peer-review articles that contained primary data, written in English and published before 2019 were included in the review.

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Results:

The search gave 576 peer-review articles written in English were then examined against our inclusion criteria: At least one type of NCP should be mentioned, and the relationship between it and pastoralism examined. The socioeconomic and ecological context of pastoralism should be described. The main traits of the study areas should be stated. Livestock management under study must be characterized by mobility. Only peer-review articles that contained primary data were included in the review. This resulted in 88 peer-review articles being selected. Supplementary articles were then added after consulting relevant experts in the fields of pastoralism and ecosystem services. This led to the accumulation of 95 articles to be reviewed. These papers were examined and compared across 37 different categories, comprising: *Study country, area and climate, If pastoralism had been defined, Traits of pastoralism, Type of pastoralism studied, Type of pastoral system, Main trend of pastoralism in the region, state of landownership, Main threats identified in the region to pastoralism, Is off-farm work discussed?, Is the role of women discussed?, Types of animals in the system, External drivers of pastoralism in the paper, Specialist product creation, Methodologies used, Is a definition of ecosystem services given?, What ecosystem services are discussed?, What NCP's are discussed (18 sub-groups)?, Specific practises of pastoralists mentioned.*

Preliminary examination of the data shows that transtermitance and transhumance are the most common forms of pastoralism found in the study, with nomadic pastoralism taking up only a small percentage of the studies (Fig1). Material, non-material and regulating NCP's are all represented in the study, with non-material NCP's representing 31% of all the NCP's found. Material NCP's represented 44% of NCP's and regulating NCP's accounted for 25% of the NCP's found (Fig2). While this appears to be an even distribution of NCP's, it should be noted that within each of the 3 groups discussed here, individual services are over-represented (Fig3). Food and Feed as a material NCP, Habitat creation and maintenance as a regulating NCP and Supporting identity have been given the most attention in the literature. With each one appearing more than 60 times throughout the studied cases. These results are in sharp contrast to the challenges faced by pastoralism that are highlighted in the study. Conflicting or piece-meal national and international policies, pastoral land encroachment, ageing populations and lack of acknowledgement of the important role that pastoralists play in terms of both land-management and cultural diversity are but some of the issues highlighted by this study.

Discussion:

This review confirmed the importance of pastoralism in providing a wide array of NCP's and its complex multifaceted interactions with the landscape. Our approach endorses and expands the recognition of the NCP framework based on data on a global scale. The over-representation of certain NCP's shows a bias in the literature towards different NCP's that should be addressed if a truly holistic picture of pastoralism and its interactions with the environment is to be created. The dominance of transtermitance over other forms of pastoralism can be seen as a symptom of poor international governance and protection of pastoralists traditional land rights and cultural complexity.

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That has in some cases led to a simplification of pastoral systems and converted what was transhumance systems into transtermitance.

Conclusion:

A comprehensive literature review was completed to analysis the role of pastoralism in relation to the NCP's framework. The literature referring to the NCP's framework in the context of pastoralism is quite narrow and offers ample possibilities for further research both geographically and thematically. Our research offers an insight into the practical use of the NCP's as a way to establish a picture of the status of pastoralism at a global scale using available case studies.

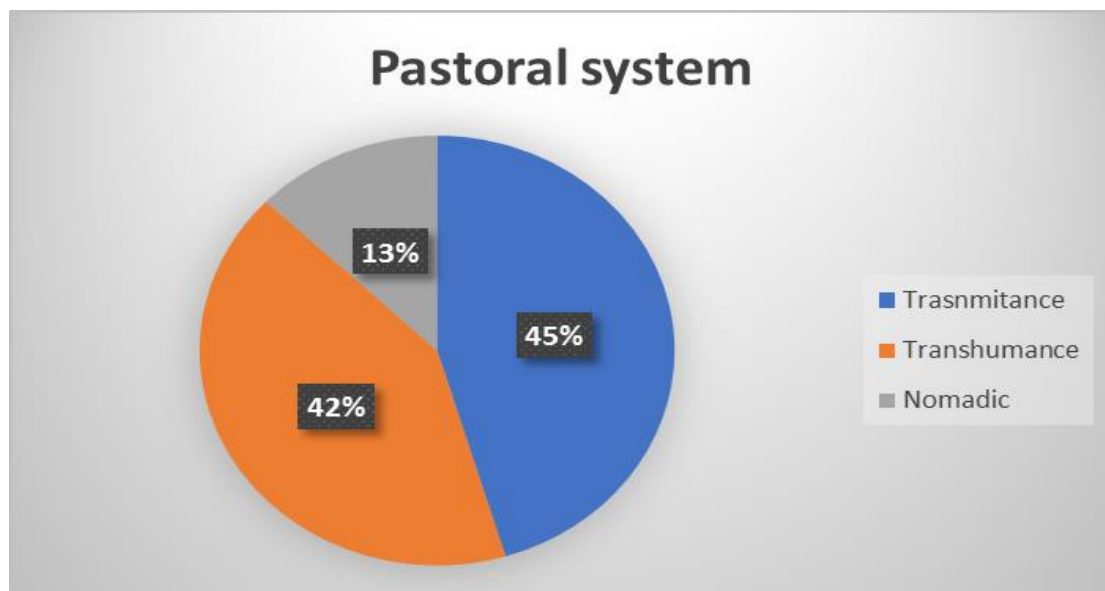


Fig1. Pastoral systems present in studies articles represented in %

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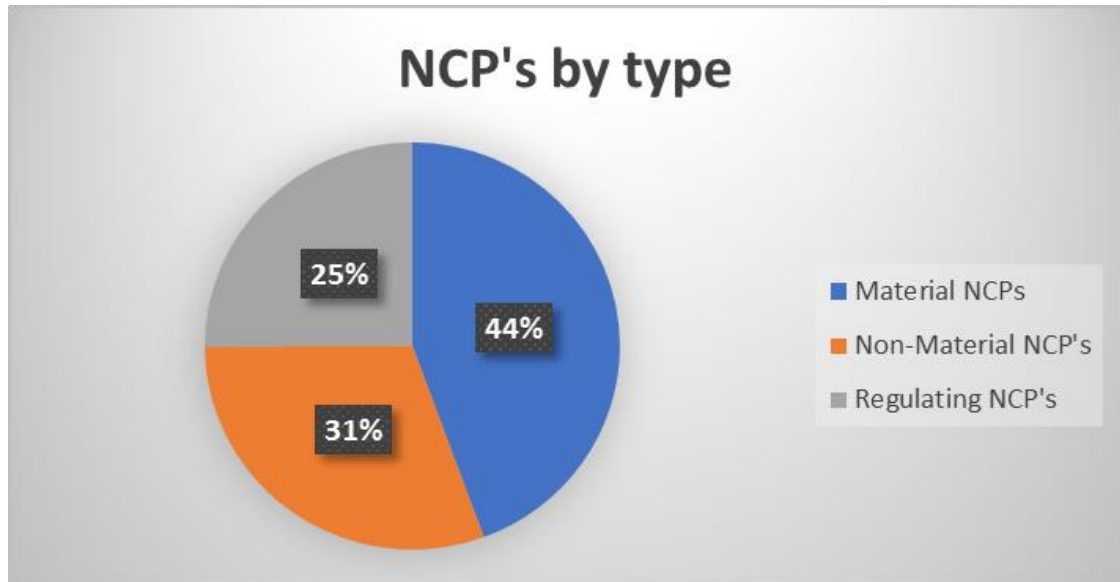


Fig2. Breakdown of NCP's found by classification

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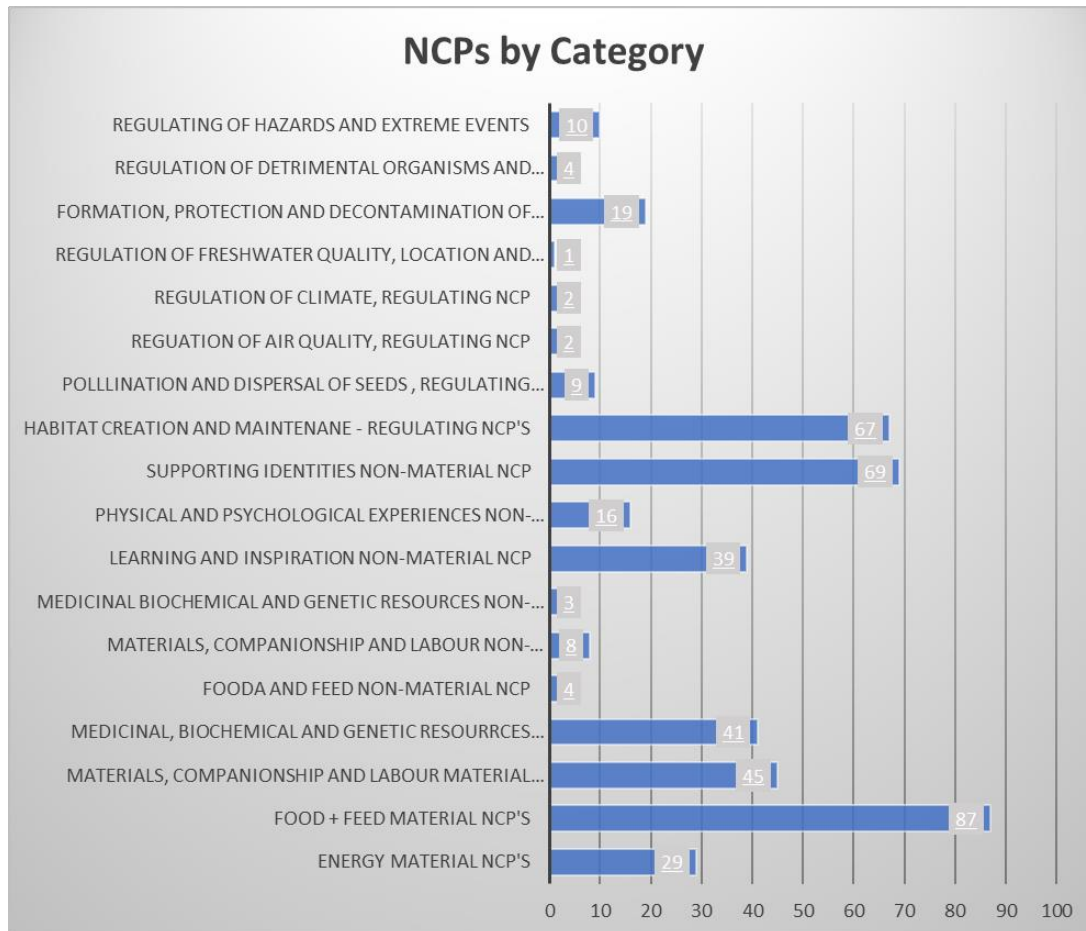


Fig3. Quantity of individual NCP's found in the studied paper

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