

Integrated agricultural systems offer opportunities to align land use with land potential

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Integrated agricultural systems (IAS) are increasingly recognized for their contributions to improve agricultural sustainability. As defined, IAS represent a form of agriculture whereby multiple agricultural enterprises interact in space and/or time, and the interactions result in synergistic resource transfer among enterprises.

An emphasis on multiple enterprises makes IAS well-suited for variable weather and market conditions, as broadened production portfolios can serve to enhance adaptability.

Inherent attributes of agricultural land are inextricably linked to climate, topography, and soils. How these attributes interact is expressed through land potential, which reflects the inherent long-term potential of land to sustainably generate ecosystem services. Matching land use with land potential should be a goal of land use sustainability, and its realization could increase yields on under-performing land and limit degradation by taking fragile land out of production.

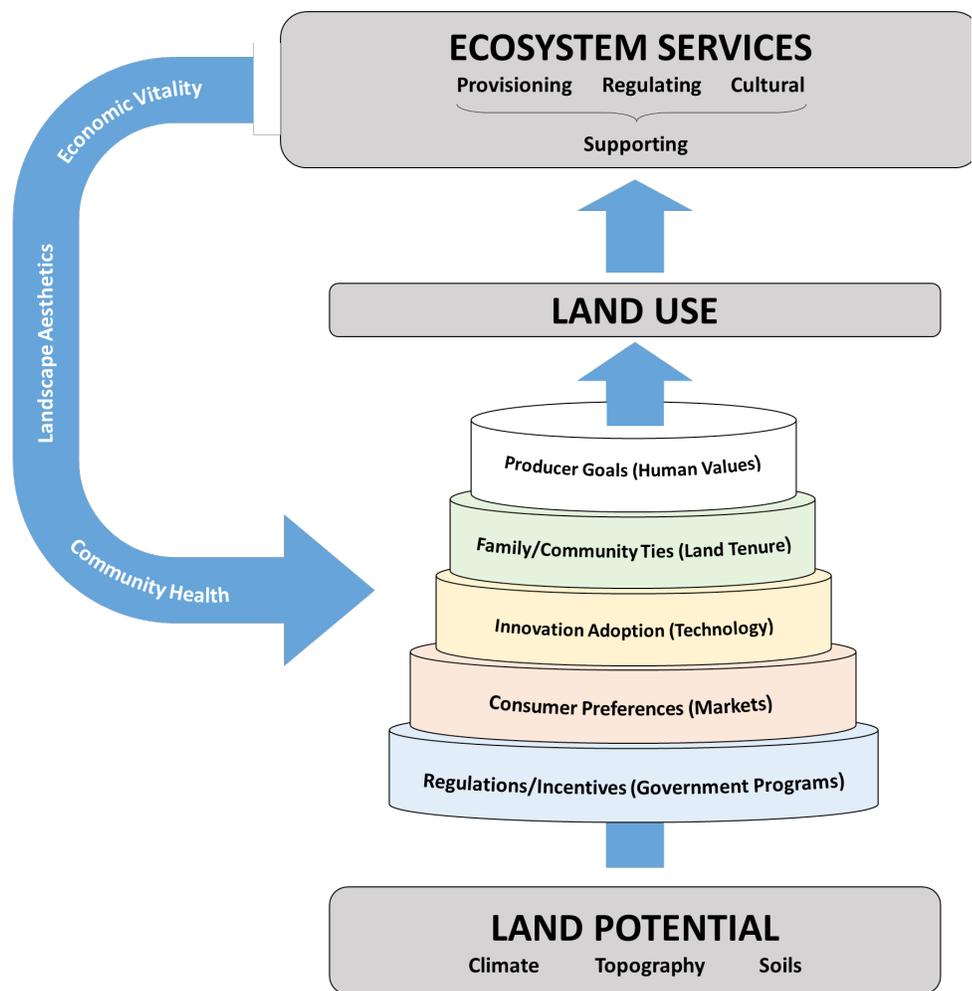
Adoption of IAS could facilitate improved alignment of land use with land potential because of an expanded range of management options, allowing for greater flexibility in managing for the unique opportunities and degradation risks associated with each type of land.

Pragmatically, application of IAS on land with varying potential represents an exercise in selecting the most appropriate agricultural enterprises in space and time. Similar to the 4R principles of nutrient stewardship, deploying IAS on agricultural land would involve placing the 'right enterprise' at the 'right intensity' at the 'right time' on the 'right

location', with the inherent attributes of location informing management decisions associated with the other variables.

Such a development could result in a transition towards multi-functional agricultural landscapes, improved delivery of multiple ecosystem services, and ultimately, a more sustainable agriculture. Achieving greater IAS adoption, however, requires removing barriers, including making available the required information for their effective use.

Adapted from M. Liebig, J. Herrick, D. Archer, J. Dobrowolski, S. Duiker, A. Franzluebbers, J. Hendrickson, R. Mitchell, A. Mohamed, J. Russell, and T. Strickland. 2017. Aligning land use with land potential: The role of integrated agriculture. Agric. Environ. Lett. 2:170007. doi:10.2134/aer2017.03.0007.



Factors affecting the expression of land potential into land use, with associated ecosystem service outcomes and feedbacks.