Diversifying Punjab's agricultural landscape could add USD 3 billion to farmers' incomes while improving environmental outcomes

The short-term costs of a transition to regenerative practices are offset by an average 30% increase in long-term farm profitability⁴

Transition pathway hypothesis Results of economic modeling Current state of agricultural landscape Implications and recommendations Transition lifts farmer income by 6% in NPV \$3 billion Net Present Value (NPV – 10%) discount) could be generated in the **Crop diversification Agronomic & Environmental** landscape with payback in year 7. decade. Land use is dominated by a mono-crop rice-Decrease area for water intensive paddy and • Over 10 years, the cumulative effect of wheat system known for intensive diversify landscape with cotton, maize and transition is positive with an average added underground water usage, high inputs and oilseeds pulses. and less affected by economic and climate NPV of 710 USD/ha.² burning practices. Widespread adoption of direct rice and market shifts. Average farm profitability lowers during an wheat sowing, alternate wetting drying, and Economic interim period and reaches a point of Regenerative agricultural practices reduce stubble management for better water usage • Punjab's farmers face high debt with volatile equilibrium ~30% higher after year 6. social tensions over water and enhance and lower air pollution. revenues from few crops, reliant on community health. · Cost savings on cash crops and higher subsidies and government purchases. **Forestry/trees** revenues from perennials are the main Implement perennials (fruit and native trees For transition to be possible, we need: contributors to the positive net change. for timber) to increase carbon sequestration, Political tensions over water rights persist increase biodiversity and further income with neighboring states; hidden health costs; Change in net profitability over a 10 years period for proposed transition diversification. Younger generations favor non-farm jobs. pathway (alternative state/current state) Indicated in relative terms

Note: ¹Undiscounted cash. ²Model focus solely on the agricultural landscape (aggregation of farms) and do not contemplate investments in technical assistance, new landscape level infrastructure and market channels. Conservatively assumes no carbon revenues or price

premiums, high fruit spoilage rates and a cyclic approach for earlier timber harvesting. Landscape transition happens all at once. ³Minimum Support Price. ⁴Costs and returns will vary significantly based on the farm's portfolio. Systemiq analysis for Regen10.org

- Public and private players to develop infrastructure and demand signals for sustainably produced rice and diversified agricultural products.
- Farmers to be provided with affordable technical aid and appropriate financial support, on top of current public incentives, during first years of transition.
- Longer-term land agreements for perennials.

Rabi Season (Nov-Mar) Kharif Season (Apr-Oct) Rabi Season (Nov-Mar) DSR³, AWD & Direct sowing Paddy (1.5M ha) Cotton (0.4M ha) Kharif Maize (0.3M ha) . Nheat (3.0M ha Oilseeds Pulses (0.3M ha) Fodder (0.5M ha) Fodder (0.5M ha) Fruit Trees (0.4M ha)

Timber (0.3M ha)

Social

addy (2.6M ha)

lder (0.5M ha)

Kharif Season (Apr-Oct)

Slash & burn

at (3.5M ha)

odder (0.4M ha)



and benefits the environment over the next

India

Punjab State

Summary

Diversification makes revenues more resilient

- Public procurement, including MSP¹, to help alternative crops be competitive with paddy.