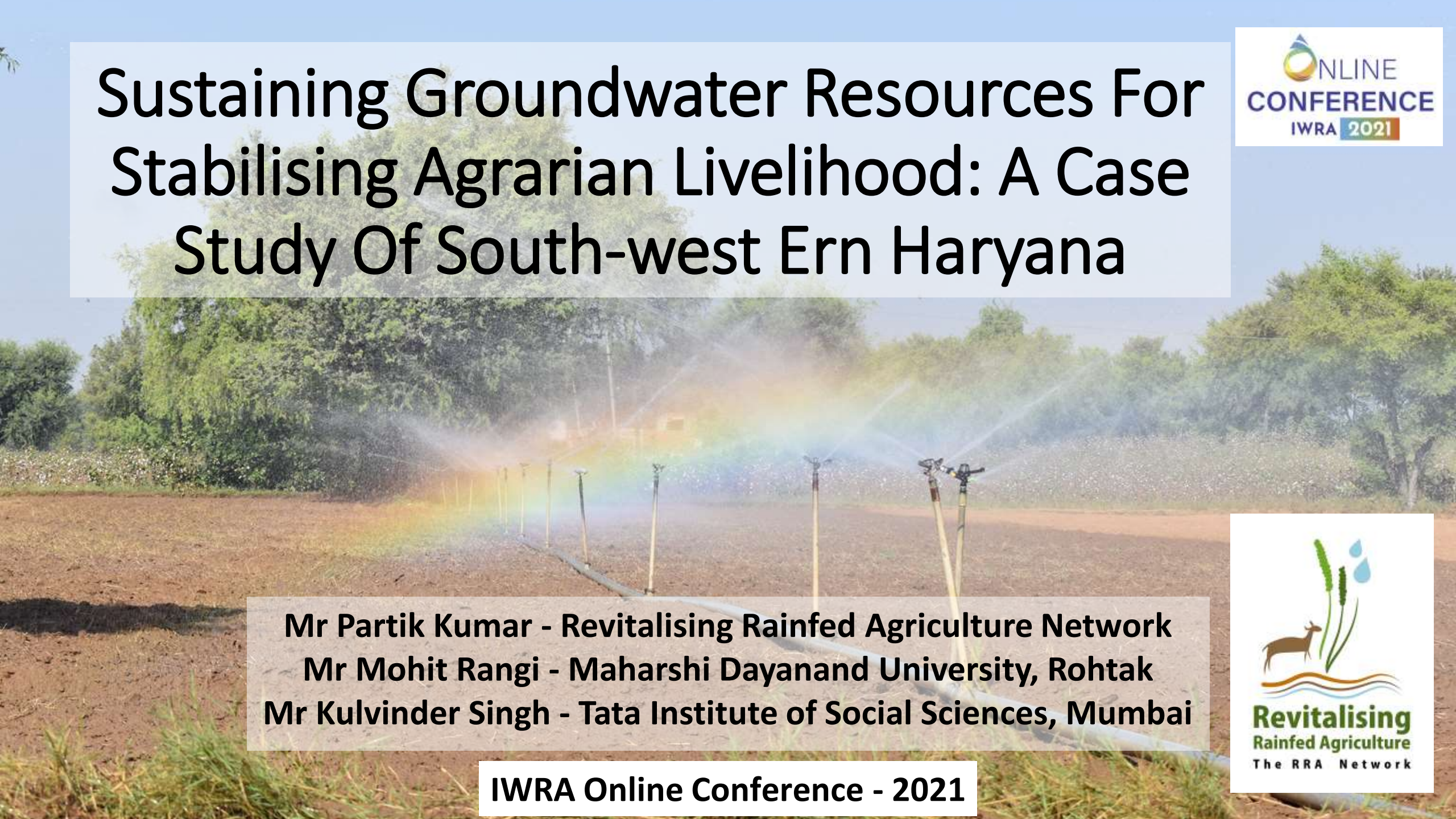
Sustaining Groundwater Resources For Stabilising Agrarian Livelihood: A Case Study Of South-west Ern Haryana



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IWRA Online Conference - 2021

Context

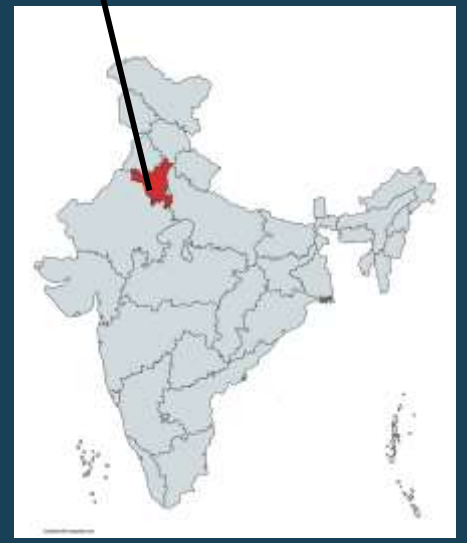
What are the factors leading to the depletion of Groundwater in the area?

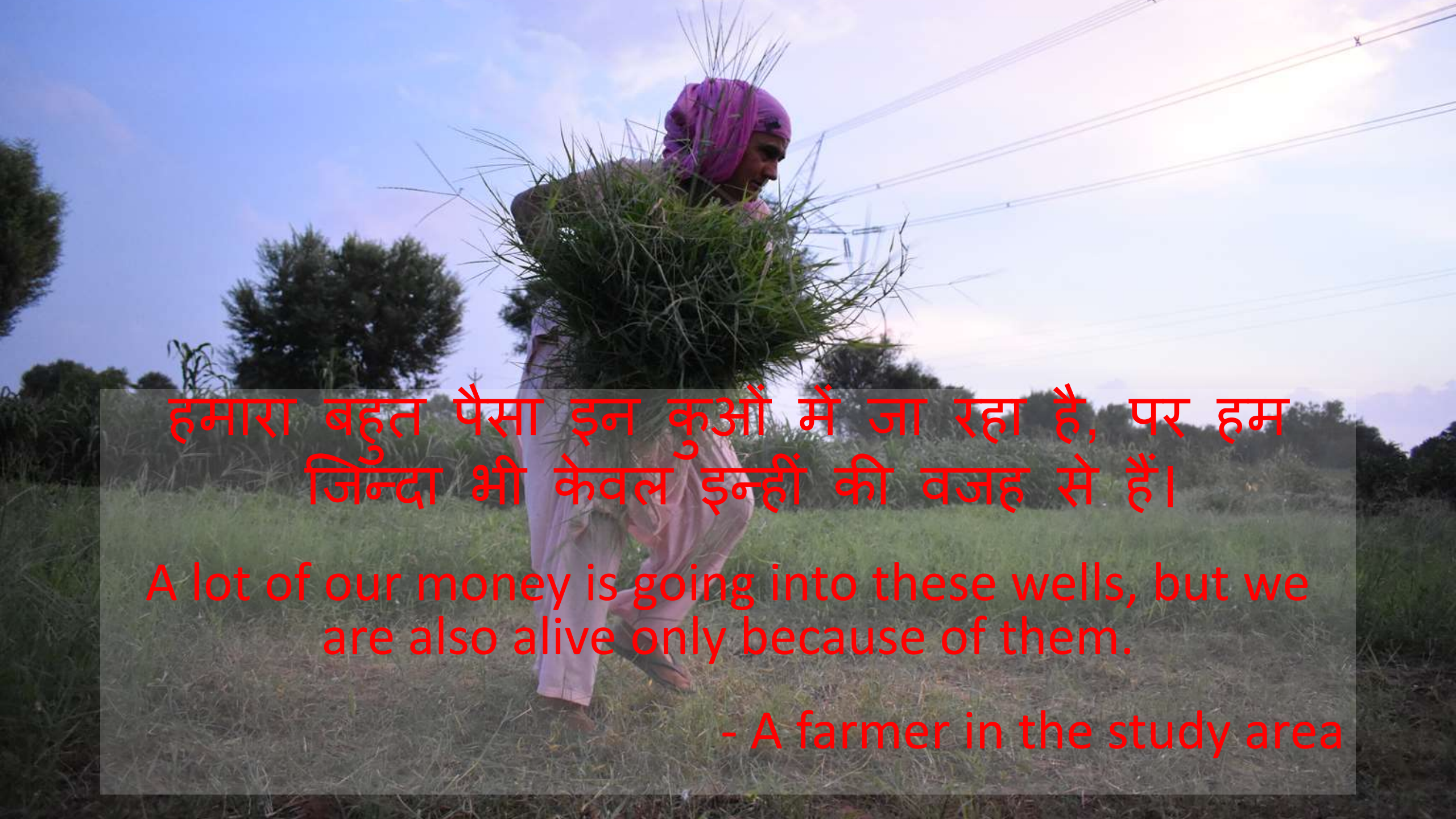
+

What are the socio-economic implication of depleting Groundwater resources?

→

Depleting groundwater resources and its drastic implication over the life, livelihood and ecology in todays time as well as over the next decade.



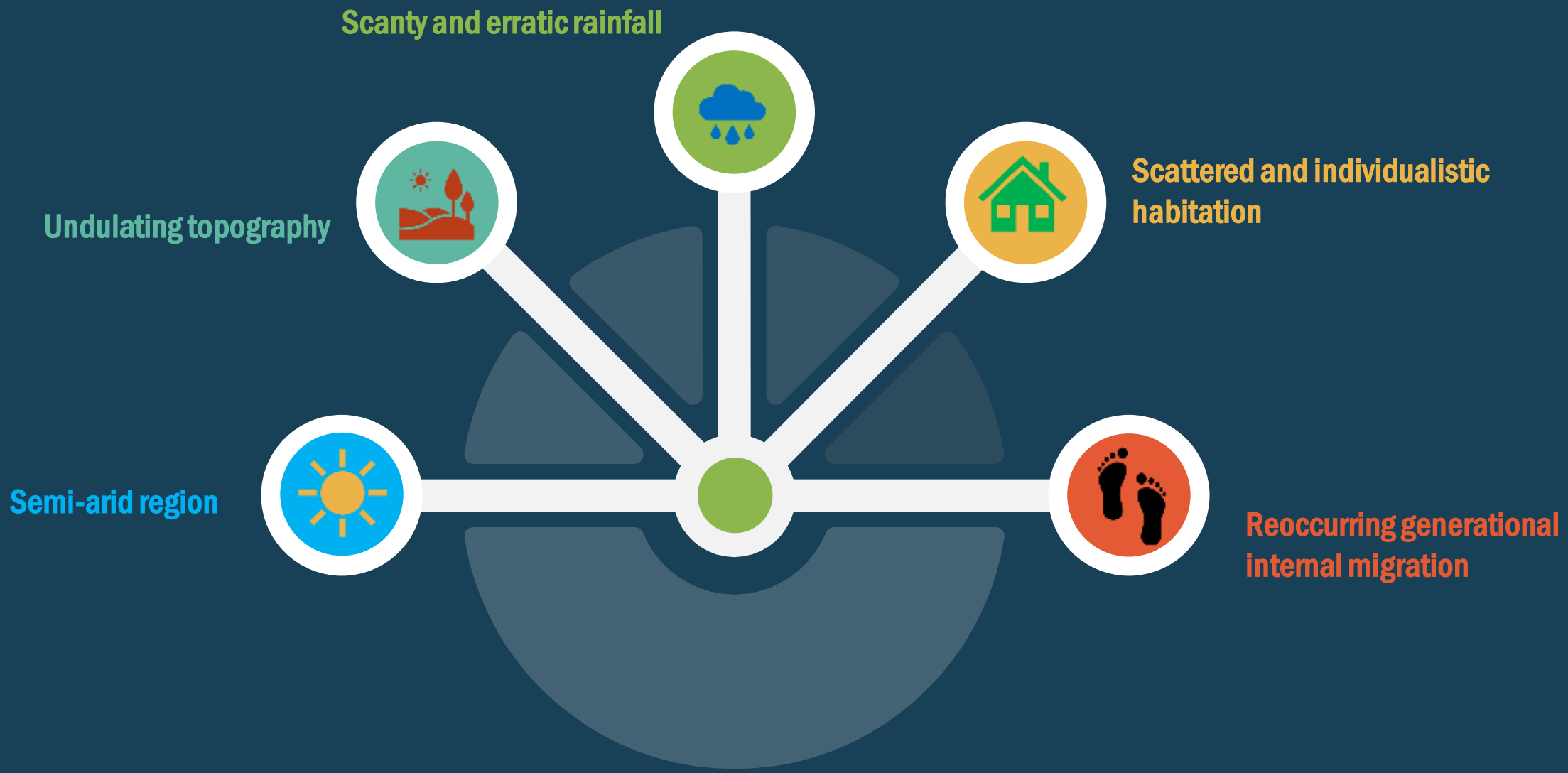


हमारा बहुत पैसा इन कुओं में जा रहा है, पर हम जिन्दा भी केवल इन्हीं की वजह से हैं।

A lot of our money is going into these wells, but we are also alive only because of them.

- A farmer in the study area

Bio-physical Characteristics And Human Geography



Water Resources and Utility - The Temporal Story

- Unproductive rainfall

- Deteriorating traditional water sources

- Depleting groundwater resources

- Challenging canal water supply

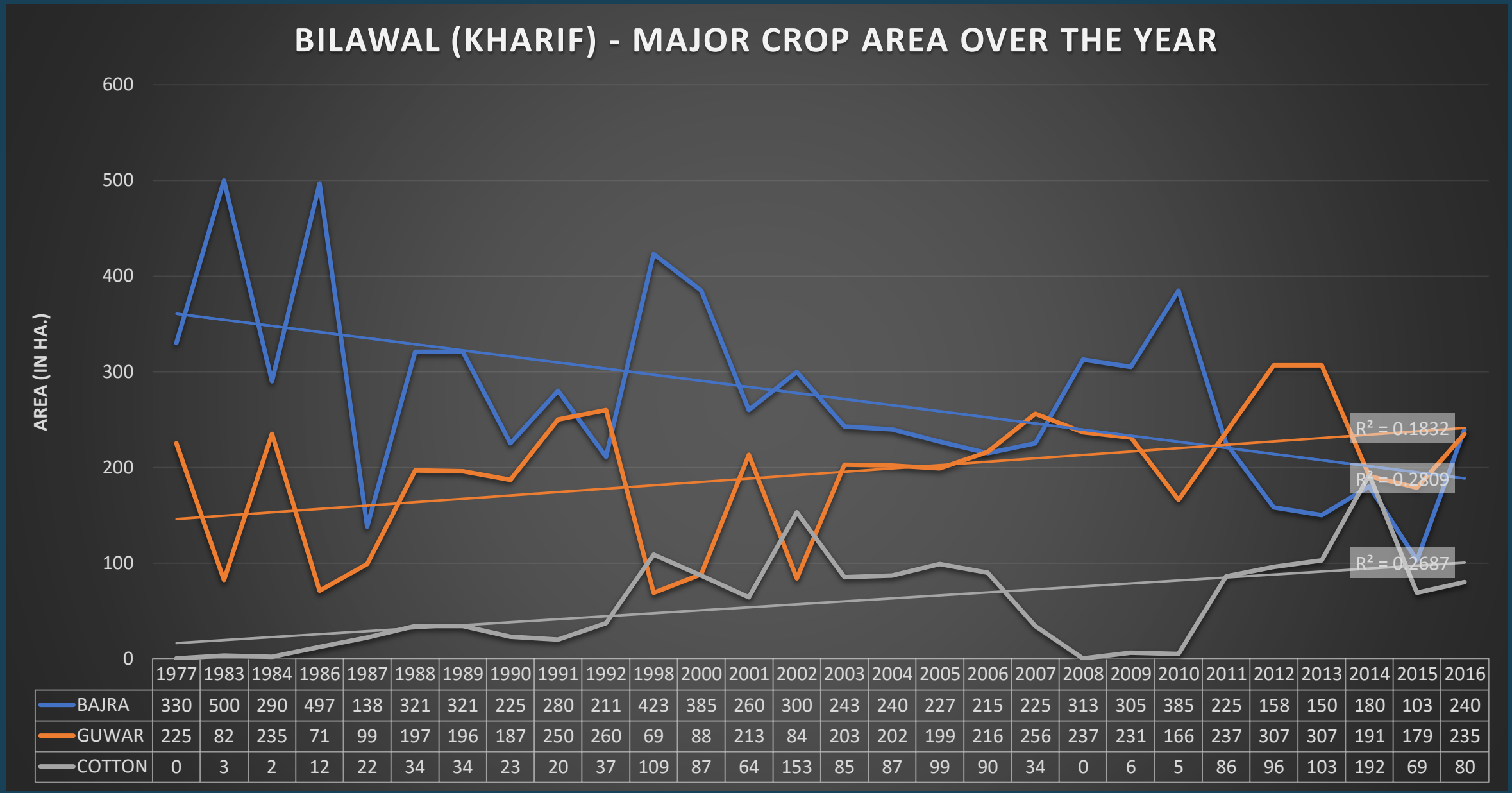
Increased agrarian and domestic water needs

Single source effective dependency

Behavioural issues of uses practices

- Absenteeism of user's managemental interaction and regulatory setup

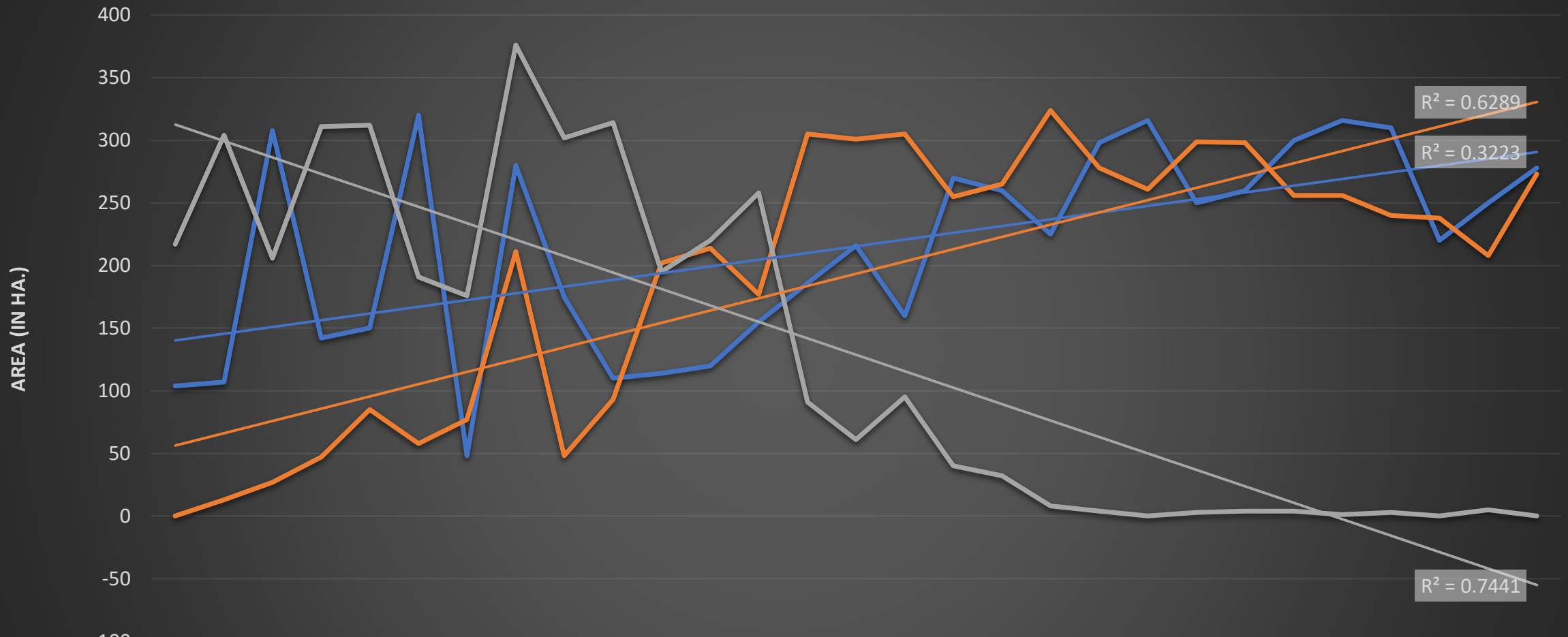
BILAWAL (KHARIF) - MAJOR CROP AREA OVER THE YEAR



	1977	1983	1984	1986	1987	1988	1989	1990	1991	1992	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
BAJRA	330	500	290	497	138	321	321	225	280	211	423	385	260	300	243	240	227	215	225	313	305	385	225	158	150	180	103	240
GUWAR	225	82	235	71	99	197	196	187	250	260	69	88	213	84	203	202	199	216	256	237	231	166	237	307	307	191	179	235
COTTON	0	3	2	12	22	34	34	23	20	37	109	87	64	153	85	87	99	90	34	0	6	5	86	96	103	192	69	80

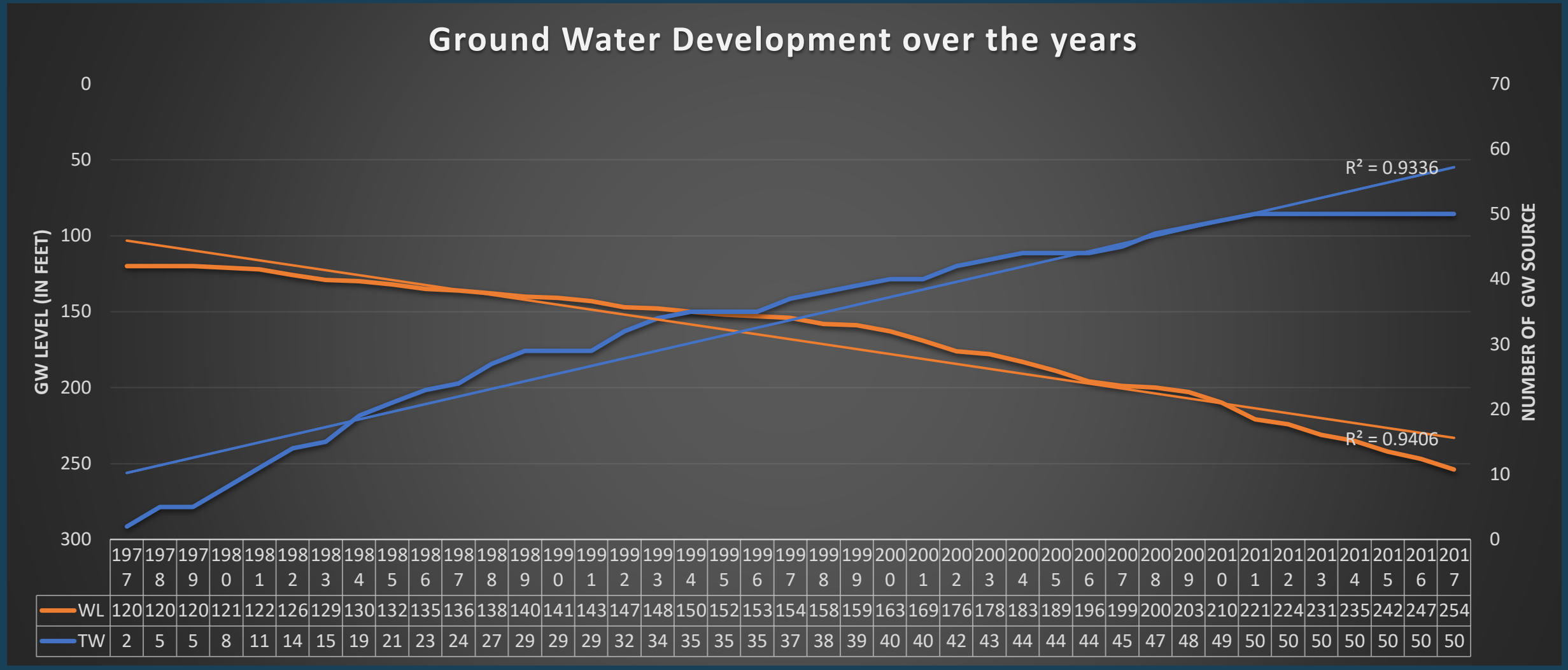
More water intensive crops are being cultivated as compared to earlier cropping pattern; Over the years, rain fed agriculture is turned into the irrigated one.

BILAWAL (RABI) - MAJOR CROP AREA OVER THE YEAR



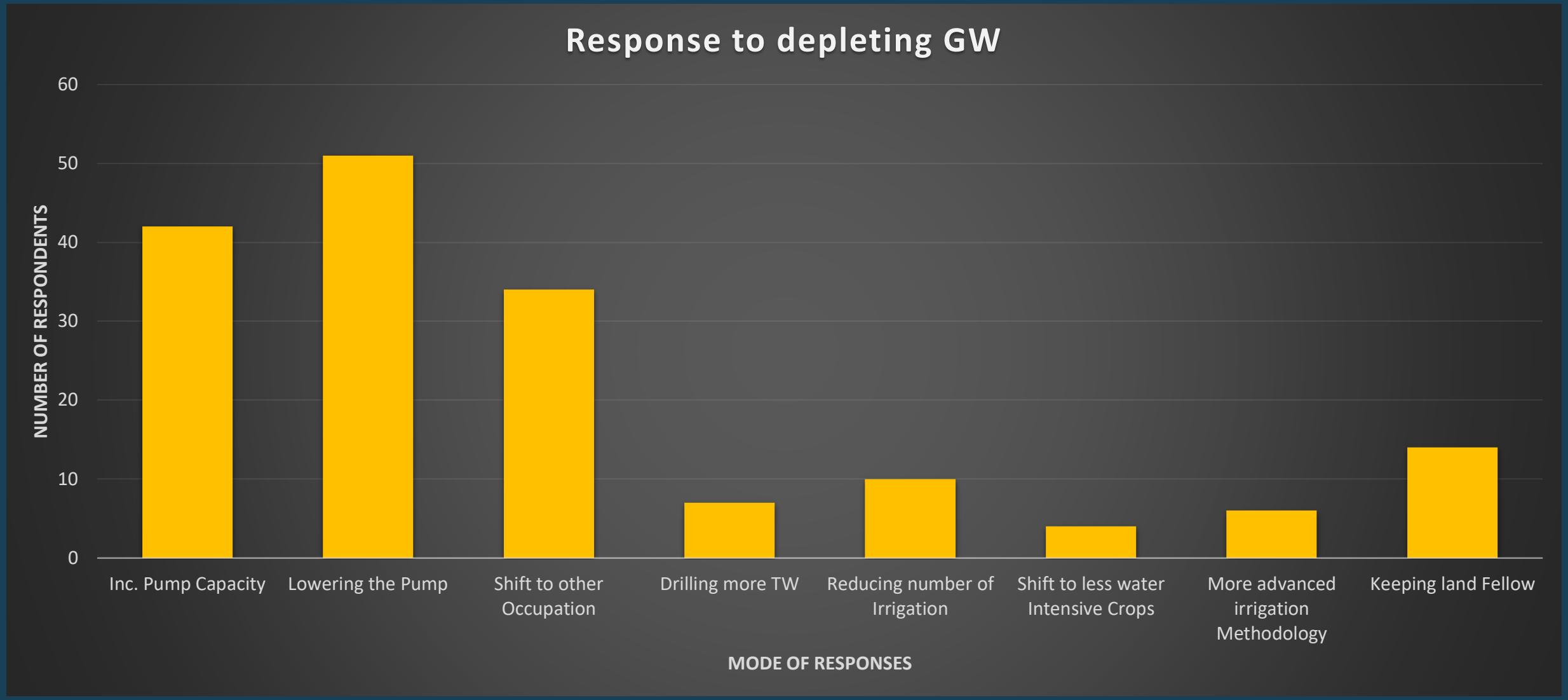
	1977	1978	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1999	2000	2001	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
WHEAT	104	107	308	142	150	320	48	280	175	110	114	120	155	186	216	160	270	260	225	298	316	250	260	300	316	310	220	250	278
MUSTERD	0	13	27	47	85	58	77	211	48	93	202	214	177	305	301	305	255	265	324	278	261	299	298	256	256	240	238	208	273
GRAM	217	304	206	311	312	191	176	376	302	314	195	220	258	91	61	95	40	32	8	4	0	3	4	4	1	3	0	5	0

The cropping pattern transition was led by the state policies under the push of Green revolution. The urge of food security was achieved at the lost of nutrition loss.



	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
WL	120	120	120	121	122	126	129	130	132	135	136	138	140	141	143	147	148	150	152	153	154	158	159	163	169	176	178	183	189	196	199	200	203	210	221	224	231	235	242	247	254
TW	2	5	5	8	11	14	15	19	21	23	24	27	29	29	29	32	34	35	35	35	37	38	39	40	40	42	43	44	44	44	45	47	48	49	50	50	50	50	50	50	50

The state agriculture and electricity policy had made the extraction of groundwater mechanically and financially viable for the farmers. Though this had resulted in increasing the farm productivity and higher income but the financial richness was achieved at the cost of drowning of natural resources particularly the ground water.



In most of the cases, the respondents (farmers) had choose to manage the supply side instead of demand side. This approach was cost intensive but was necessary to maintain the production status-quo.

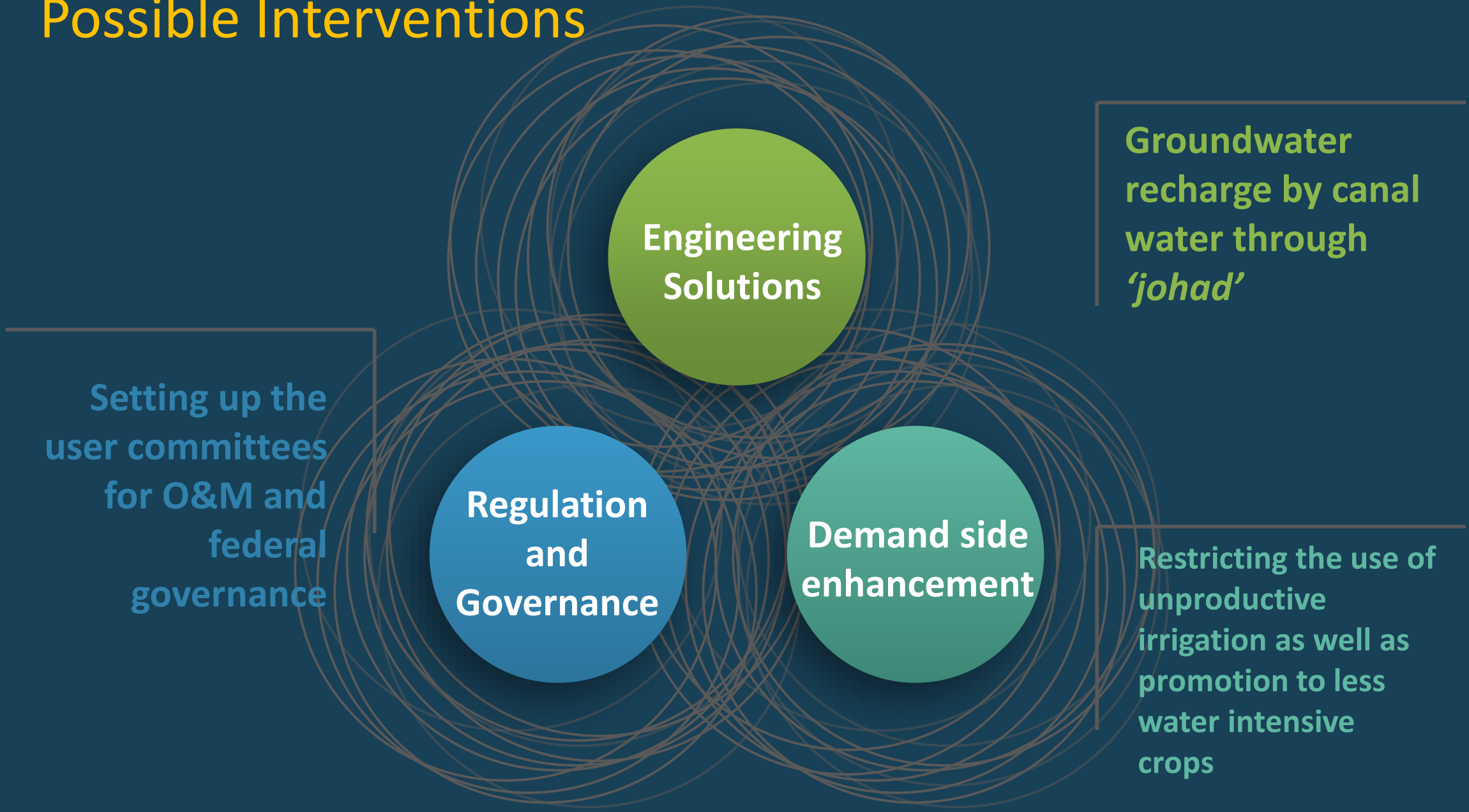
Socio – Economic Implications

- Economic Implications Of GW Depletion
    - Lowering of Pump – 52 feet; 2.3 times in last 10 years
    - Increasing Pump capacity - 10.7 hp to 15.1 hp on an average in last 10 years
    - Deepening of tube well
    - Annual cost of O&M for irrigation – 8220 INR
    - Pump Failure – Time And Social Cost

GW Depletion, Coping Mechanism And Livelihood Status

- Capital Incentive
    - Sourced mainly from Agriculture income and non-agricultural sources (livestock and tertiary sector)
- If Agriculture become a non-profit venture due to increased COC and O&M of irrigation
    - Other source of capital investment in GW are Livestock and non-agricultural sources.
        - First exclusion - SC and marginalised
- Issue of Life and livelihood
    - Food – Agriculture
    - Drinking water – Common source
    - Livestock – Water Market
    - Dual Migration

Possible Interventions



Engineering Interventions

Demand Side Interventions

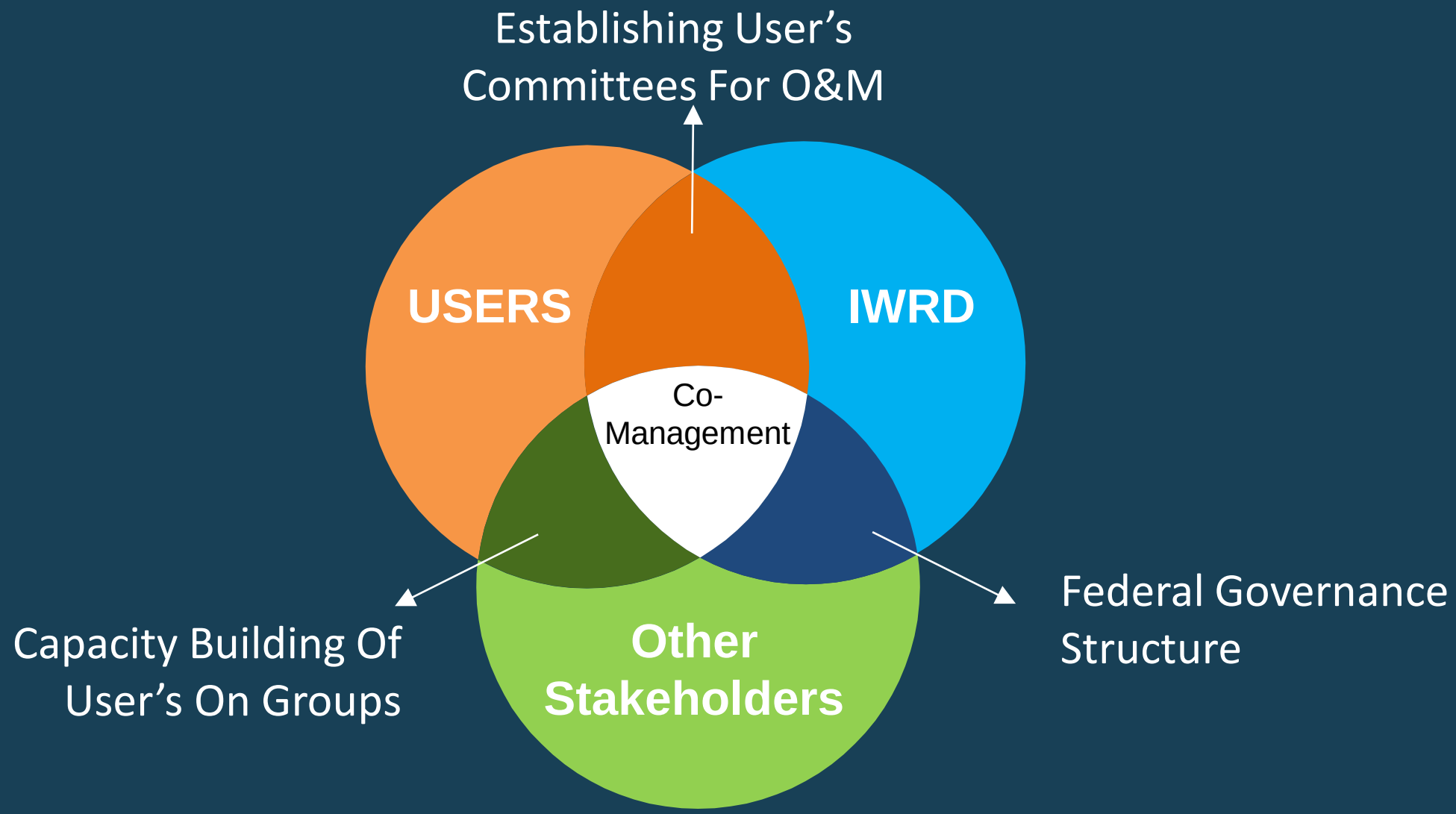
Reducing Unproductive Irrigation

Recharge From Domestic Waste Water

Promotion To Less Water Intensive Crops

Sensitization Towards Water Resources

Regulation and Governance Interventions



Perspective Intervention Matrix

	Efficiency	Equity	Sustainability
Community	Water related – pumping systems, irrigation efficiency etc.; Economic – improvement to CBR	Access to domestic water; access to irrigation – systematic access rather than random; distribution?	Sensitization to concept of aquifers and CPRs – restoring shallow aquifer
Program	Modernised Agriculture Water Balance	Participation, co-operation and decision making at Panchayat level	Conjunctive use – rationalisation of demand and supply
Policy	Procurement and MSP; information and knowledge	Regulation through protocols	Seriously address efficiency and equity issues to ensure sustainability (perhaps, aquifer based management for incentives and disincentives)

Thank You!!!

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Revitalising
Rainfed Agriculture
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