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Categories and Cultural Models of Nature in Northern Punjab, Pakistan

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Introduction and Theory

The sub-district of Fateh Jang, in Attock District, is a semi-arid agricultural area with an overwhelming proportion of the population classified as rural (around 78% according to the Pakistan Bureau of Statistics¹). There are very few sources of surface water that can be relied on year round, and in the areas that form the specific focus of this working paper there are none. Historically, this has greatly restricted agriculture to those crops which can withstand extended periods without water, namely maize and wheat. Farmers have practiced mixed agriculture with buffaloes, cows, goats and sheep. Farm sizes in the area are not extraordinarily large by Pakistani standards, but the local landowning families have managed to maintain a remarkably coherent control over the peasant families using a variety of political strategies. Most farmers, therefore, do not own much, or even any, of the land that they cultivate.

In the past, the labor was arranged along South Asian sharecropping patterns, where the landowner served as a form of insurance for lean years and collected 50% of the yield at all other times (Lyon, 2004). In addition to collecting a half share of the crop yields, landowners could expect a certain number of days of labour from their sharecroppers and their families who would provide the labour for the lands that the landowners chose to retain under their direct control. Such relationships of service and obligation tied peasant and landowning families not only to one another, but also to service families in the village, such as barbers, story tellers, leather workers, metal smiths and so on. In the late 1990s, this residual *jajman*, or *seyp*, relationship was still reasonably widespread and there were few economic opportunities for poor people to secure alternative forms of reliable wage labour, though young men frequently left the region to work for wages for temporary periods. The most reliable mechanism for escaping the relationships of servitude and poverty available to peasant families was military service. From the 1970s, economic opportunities in Arab countries like Dubai, Qatar or Saudi Arabia became an increasingly viable means of escape as well.

Since the 1990s, one of the most visible changes to labor relations that have occurred in this area is the collapse of the traditional service relationships and sharecropping patterns. There are still some old peasant farmers in some form of sharecropping arrangement, but the landowners are increasingly required to pay day wages to the people who their land. They have also increased the use of rent both as renters and rentees. They have become less important as a form of insurance for hard years, though that role is not entirely absent. Dominant ideas about 'good' neighbourly relations impose expectations of charity on households and result in families feeling obliged to help in times of difficulty. This is done with some resentment since landowners must now 'bail out' poor farmers in times of hardship, but not reap the rewards of large shares of crops they had no part in producing. They do retain considerable prestige in the area, though the more overt forms of deference visible in the late 1990s are largely absent.

Surface Water and Rain.

It is something of a truism to say that reliable sources of water are critical for the development of many types of agriculture, but nowhere does this become more clear and pressing than when there is a complete absence of any year round surface water. Large parts of Pakistan lack rivers or streams which provide reliable water throughout the year. Some places which historically had such surface water have now found these less reliable because of the development of major hydro damming projects which have changed the flows downstream. In the Fateh Jang sub district in Attock, there has never been reliable surface water. They relied on rains for agriculture as well as drinking water for themselves and their animals. In the past, people say that the rains used to come more predictably and in greater quantities, but they have always been susceptible to short term droughts and unpredictability.

Local Rhetoric of Nature.

Identifying a simple noun which encapsulates local cultural models of nature is potentially problematic in any society. Clearly, the term nature, in English, has a variety of meanings which shift depending on the context and have demonstrably shifted over time. In rural Punjab, the Urdu word for nature, *kudrut*, is understood but does not mean much. In other words, people seem to understand the word, but give it little to no thought on its own. This is, nevertheless, the term for nature that is most widely understood and recognized locally. It is very much something that acts upon people. Locally, people render this noun into what would ordinarily be the adjectival form with an ending 'i', but this does not mean that the word has been rendered into an adjective. One of the remarkable characteristics of the way people speak in Punjab, and particularly in the rural areas, is the playfulness with which they twist and modify words. The use of nonsense rhyming words is widespread and people happily modify standard words to suit their sense of aesthetics at the moment. Lyon once had a Bollywood² film called *Zakhm* (wound), on DVD. He told people the name of this film and they systematically referred to it as *Zakhmi*. When he showed the literate men the title on the DVD to prove that in Urdu there was no ending 'i' on the word, they shrugged and said that was probably correct, but *zakhmi* sounded better.

Kudruti includes trees, land, animals, rain and so on, but it is not a passive thing around someone. It is an active thing that impacts on people and has a personality. People have *kudruti* as well. So when we ask for *kudruti*, we must narrow it down a bit to the *kudruti* of the 'atmosphere' (*mahole ka kudruti* or *kudruti mahole*) or a specific person's *kudruti* or a category of person's *kudruti*. This may suggest a more holistic concept of nature which integrates all of the animals, plants, weather and people into a single system which is impacted by larger supernatural force—which in this case is clearly God, or Allah.

Methods

We carried out a number of tasks to elicit a range of information about nature. This included:

- Semi-structured interviews about the environment change over time;

- Free listing task on several categories of ‘natural’ things:
- soil (n=35)
- animals (n=15)
- trees (n=7)
- plants (n=8)
- weather (n=11);
- The animals-in-a-row task (n=10).

The gender ratio of our participants was heavily skewed towards men in all tasks. We were not granted direct access to any women for these tasks. Although Lyon has worked in the same village for more than 17 years, and is therefore given considerable freedom to enter the private areas of the households, normally reserved for related men (*meharam*), it would be inappropriate for him to seek an extended interview with all but a select number of women. Indeed, even when he has had the opportunity to carry out extended interviews with very old village women, he has subsequently been asked to refrain from publishing anything from these interviews. It can be difficult for foreigners, especially European and North Americans, to appreciate the delicacies of gender expectations in rural Punjab. Families and households are judged on the behavior of the individual members, and particularly on the reputations that develop around them. One of the many constraints on the breadth and quality of these data is, therefore, the absence of women. This is not surprising and Lyon has previously reported on the notable segregation of genders in this village (Lyon, 2005; Lyon, 2004). Despite Lyon's unsatisfying previous attempts at addressing this absence by employing a female social scientist, we hope to address this issue in future research.

Semi-Structured Interviews.

These data remain only preliminarily coded and analysed, however, a number of striking points are worth mentioning here. Firstly, there is a clear consensus among farmers of all ages, that the climate has changed. Weather patterns are more erratic and rain, in particular, is less predictable. The village has endured periods of sustained drought as well as inundations of rain, both of which can result in catastrophic crop failure for small farmers. The largest landowners are able to survive in part through substantial investment in tubewell irrigation and by selling parcels of land in poor years. Land in the area around the village has risen in market value substantially in the past decade. With the introduction of a modern motorway in the early part of this century, residential ‘societies’ have begun to spread from nearby urban centres, including the capital, Islamabad, which is roughly 50 kilometres away. Travelling to Islamabad in the late 1990s took roughly 1.5-2 hours. On the motorway today, the same trip takes about 45 minutes. Since much of the land in the area is considered *banjr*, or uncultivable, landowners have reluctantly agreed to sell land they cannot afford to transform in order to either invest in other areas (such as orchards) or purchase modern technologies, cars, or build new homes and guest houses.

When queried about possible causes of climate change, illiterate and semi-literate farmers expressed a human cause, but not one that is entirely compatible with

contemporary scientific models of climate change. The recurring theme revolved around Allah's wrath triggered by immoral human behavior. This was expressed in various ways. One man pointed at his chest and said Islamabadi women were showing too much of 'this' (cleavage). Another quietly suggested it was a consequence of rich Pakistanis drinking too much alcohol.

Lyon took a local farmer with him to Islamabad for company while he met with urban based business men on unrelated matters. The business men spent the evening drinking and watching modern Bollywood music videos with very scantily clad women dancing extremely suggestively. There was one video in which a woman poured champagne from the bottle over herself in a scene that can only be described as proxy-porn. In the morning, after some of the business men had gone home and others were still sleeping off their hangovers, Lyon discussed the previous evening with the local farmer. The farmer was shocked at the previous night's display and said that this was why Allah was angry and it was why the Taliban could never be defeated. Good Muslims, he said, were appalled by this scandalous Indian culture/behavior, and so it was understandable that some would turn to groups like the Taliban to try and maintain the moral standards that Allah wanted for humanity. He is not a man who condones or supports violent political action, however, he was deeply disturbed by both the videos and the behaviors of the wealthy Pakistani business men.

The single greatest change in the region in the past three decades has been the increase in irrigation. The first tubewell was sunk in the village owned lands in 1981. That was on the site of the first citrus orchard which was developed roughly a decade later. There has been little, if any, coordination in irrigation practices among those landowners with the resources to develop tubewell irrigation. Consequently, the water is poorly distributed and the burden of investment is difficult to organise in ways that might generate economies of scale. The persistent land disputes have hampered village wide irrigation cooperation and these show no sign of diminishing, as the total amount of land available for agriculture is reduced and landowners sell off parcels of land to housing developers.

The drive towards greater and more reliable irrigation has led to the adoption of non-native crops to the region. This has had some negative consequences on farm employment. Landowners report a lack of confidence in local Punjabi farmers' ability to carry out non-*desi* (indigenous/local) farming practices. Some landowners have consequently employed migrant Pukhtun/Pathan laborers. Pukhtuns have a long tradition of migration and therefore are presumed to be more versatile in their ability to learn new farming techniques. Partly to address the perception that local farmers adapt poorly to new crops, government extension workers from the National Agriculture Research Centre have provided training for local farmers when landowners have agreed to participate in experimental trials of new crops (notably growing True Potato Seed and Canola).

There continue to be a large number of local Punjabis employed in farming despite a desire to employ Pukhtuns. In addition, the rise in political instability has also led to a growing reluctance to have too many Pukhtuns living around the village. For the most part, Pukhtuns are not invited to live in the village itself but are provided

housing that is several kilometres outside the village where they can watch over and protect the fields for which they are responsible. Pukhtuns who are in the area for purely seasonal labor seem to stay with the Pukhtuns living outside the village. There are a surprising number of them around and in addition to working as farm laborers, they are occasionally called on to act as hired guards to intimidate rivals. While relations between Punjabis and Pukhtuns is courteous and cooperative when dealing with farm matters, this has caused considerable discontent among local farmers. Punjabis worry about what they say is an increase in kidnappings for ransom and in particular, worried for Lyon's safety. While in the late 1990s, Lyon was afforded more or less total freedom to interact with any man in the region, since 2007, local people have expressed a great deal of unhappiness about him interacting with Pukhtuns outside of their presence.

While we have no verifiable data on the number of kidnappings for ransom in the area, these are reported to have increased dramatically. Lyon has met with family members and victims of those involved. The sums of money demanded are well researched and correspond with the amounts that a family can generate within about two weeks. The victims report being reasonably well treated in standards which are clearly tied to their socioeconomic status (i.e. wealthy kidnapping victims say they are locked into comfortable bedrooms with televisions and newspapers; poor victims may be kept in disused animal stables). Despite the reports of reasonable treatment, all victims are aware that the consequence of not paying is serious and typically means death.

The frequency of reported problems, political, climatic, economic and others, reflects a growing sense of frustration and dissatisfaction among farmers. Throughout all conversations, most farmers repeatedly muttered praise or gratitude for Allah when discussing difficult times (*Mashallah, Allah ka shukr, Allah hum de leyla* etc.). In one interview about the nature of Allah's creation, one literate farmer explained the relationship between different types of creatures. *Insahnayat* (humanity) was Allah's greatest creation and all other creations were there to serve *insahn* (man/human). This concept was echoed in other interviews, though not articulated as elaborately or coherently. We will explore this model of nature further in the future when all interviews have been comprehensively transcribed, translated and coded.

Free Listing Results.

The free listing exercise proved very useful, despite the challenges of carrying out such an exercise among a largely illiterate or semi-literate population. We could not give participants a sheet of paper and pen and ask them to list all terms associated with an idea. Instead, we asked them to verbally tell us types of land, or types of trees. They were clearly able to provide lists, but typically wanted to provide a context for each term. So when we asked about land types, the participants often provided us with examples of where we might find the specific land or soil type. They used terms like, *lepara*, and told us which specific fields that we had seen were examples of that soil type. While somewhat frustrating at first, this proved an invaluable source of information that was far richer than the simple lists of terms we sought.

We carried out free lists on land types with 35 men. All of the men were born in the region and have lived most of their lives in and around the village, though many have spent various periods of time as wage laborers outside of the village. Determining ages is imprecise at best, but we estimate that the ages ranged from late teens to mid 80s. Participants included men who own land as well as those who work exclusively on the land of others. There were two landlords (*zamindar*) included in the sample as well since they are not absentee landlords and work regularly with the peasant farmers. So while they do not tend to carry out actual manual labor, they are intimately involved in all the tasks performed and spend much of their time advising and overseeing their farm laborers.

Soil and Land Types.

Since the late 1990s, Lyon has been collecting data from experts on soil types. These experts include farmers who are said to be knowledgeable, soil scientists from the Pakistan Agricultural Research Centre and the published literature on rain fed agriculture in Punjab. The lists have varied a bit, but have included the following terms:

- *Retlee*– sandy land
- *Patrelee*– stony land
- *Hulky zehree*– white land (also called *kamzour*)
- *Ruhkr*– uncultivated, unbalanced land
- *Ruhtee*– red land
- *Sufaid*– white land
- *Surukh*– red land in Urdu

This is not, however, a comprehensive list, because a specialized vocabulary for cultivated land also is used that includes words like:

- *Mera* – powerful land (people describe this as *achi* (Urdu) or *changi* (Punjabi), both terms for good.
- *Luss* – near the village where the land gets animal fertilizers
- *Lepara cheri* – this is said to be the best land
- *Hulky mera* - weak land
- *Banjr* – forest, uncultivated

In practice, soil experts working in rain fed areas of northern Punjab, have reduced these land types down to two salient categories: *lepara* and *mera* (Byerlee, Sheikh, and Azeem, 1992). This reflects, in part, the focus of experts on soil that is most likely to produce high agricultural yields.

In Table 1, all terms listed by two or more farmers have been included. It would appear that agricultural experts and local farmers are employing different categorical criteria for classifying land. Although they are both driven by concerns with fertility, local farmers employ color terms to distinguish highly fertile soil (*kaali*=black) from less fertile soil (*chitti*=white and *retlee*=red). Farmers know a great many terms for soil and employ numerous synonyms, including some very playful ones that combine nonsense rhyming words on the end of the soil type (for example *chitti-shitti*). The use of nonsensical rhyming words beginning with *sh* is very common in

this part of Punjab and the principle is found across a number of South Asian languages³.

After the three most common color terms for soil (*kaali*, *chitti* and *retlee*), the terms drop considerably in frequency and salience. The remaining terms describe a range of physical properties of the soil, such as rocky (*petrelee*) or hard (*sakhat*). Many of the soil types provided do not exist in the local region, but farmers are aware of neighbouring areas where these can be found.

Animals

We asked 15 male farmers to list animals that were present in the local area. Some men included camel (*oont*), which do not live anywhere in the village or in immediately neighbouring villages, but pass through the area periodically and exist

Table 1: Soil Types (All Terms Listed 2 or More Times)

Item	Frequency (%)	Average Rank	Salience
chitti (white)	80.0	3.25	0.439
kaali (black)	77.1	2.78	0.515
retlee (red)	60.0	3.57	0.357
banjr (uncultivated)	17.1	6.50	0.069
patrelee (stony)	14.3	3.00	0.104
sakhat (hard)	11.4	1.75	0.097
kallar	8.6	3.67	0.055
naram	8.6	2.33	0.059
khushak	8.6	1.33	0.071
surukh	8.6	6.33	0.034
sem	8.6	6.00	0.022
ruhkr	8.6	5.33	0.046
seekra	8.6	6.33	0.015
tibbay	8.6	4.67	0.029
zarkhez	8.6	2.00	0.066
baraani	8.6	2.33	0.063
mera	5.7	8.00	0.024
matt	5.7	1.50	0.054
luss	5.7	9.00	0.019
pathar	5.7	5.50	0.021
ghulabee	5.7	4.00	0.026
changi	5.7	2.00	0.046
hulky-zehree	5.7	3.00	0.048
kassi	5.7	6.00	0.021
kanjur	5.7	5.00	0.025
lepara-cheri	5.7	10.00	0.014
hulky-mera	5.7	11.00	0.010

in villages within 20 minutes' drive. One person listed camel as camel-horse (*oont-gora*), suggesting that while known, camels are not particularly important categorically in the local contexts.

The top three animals listed are, unsurprisingly, the most ubiquitous animals present in the area: buffaloes, cows and goats. Each was present in 93.3% of the lists and came early in most peoples lists. Very few of the animals listed were not domesticated farm animals, though some pests were included (for example *kundey-wala* a type of insect and *seyr*, wild boar). There were birds included, though in no case did any farmer begin his list with a type of bird. Animals of prey (quail, partridge, rabbit) and burden (donkey, horse, bull/ox) were included. Sheep and cows were listed by sex (*doomba*=ram, *bheyr*=ewe, *gai*=cow, *dand*=bull or ox). Animals that do not have different root terms for sex difference were not listed separately (e.g. horse=*gora*, mare=*gori*). There were no terms for animals which had been castrated, which is not surprising since this is not a common practice in the village. They do not keep male animals in large numbers and those that are present (like rams) are used for reproduction before being slaughtered for meat.

Trees

We free listed trees with fewer farmers because most farmers claimed to draw a blank on trees. While we could successfully encourage them to name trees by prompting them with some suggestions, we discarded all free lists that included terms that we had suggested. Consequently these terms were generated from only 7 farmers. Despite this low number, there were 59 tree terms listed, so those farmers who did know trees, tended to know rather a lot of them. There were far fewer terms listed two or more times, however, suggesting that there is not as much shared knowledge of trees as either animals or soil types.

Perhaps the most interesting thing about this list is the frequency of *malta*. This is an imported variety of citrus tree which has become extremely important in wealthier farmers attempts to generate more income from cash crops. Only very wealthy farmers can afford to introduce any type of orchard because the initial investment is very high and the subsequent demands for irrigation are ongoing, both in terms of energy (either electricity or diesel to power the pumps at the tubewells), and maintenance. The first orchards in the area were citrus trees. These were introduced beginning in the early 1990s and there was one well established orchard when Lyon first arrived in the village in 1998. At that time, two other farmers were investing in citrus orchards outside of the village. In the past 10 years, wealthy farmers have invested heavily in more diverse varieties of orchard (primarily peaches and grapes). Although *malta* is the most frequently cited tree, it had a lower average rank than all but two of the eight most frequently cited terms. This may suggest that while it is a well known tree, it is not particularly important for peasant farmers.

Table 2: Animals (All Terms Listed 2 or More Times)

Item	Frequency (%)	Average Rank	Salience
beins (buffalo)	93.3	2.00	0.874
bakri (goat)	93.3	3.29	0.778
gai (cow)	93.3	3.07	0.782
kutta (dog)	73.3	7.73	0.357
gudda (donkey)	66.7	6.10	0.391
billi (cat)	60.0	7.89	0.263
chiri (sparrow)	60.0	11.56	0.204
kava (crow)	53.3	11.00	0.177
doomba (ram)	53.3	5.75	0.381
bheyr (ewe)	53.3	4.50	0.386
gora (horse)	40.0	6.00	0.244
seyr (boar)	40.0	9.33	0.184
teetr (partridge)	40.0	15.00	0.063
battaira (quail)	40.0	14.50	0.072
saor	33.3	9.60	0.144
kongi	33.3	11.00	0.107
lumbr	33.3	11.00	0.105
loali	33.3	9.80	0.133
pagyar	26.7	8.50	0.138
dand	26.7	7.25	0.162
bad	26.7	9.50	0.121
sanp	26.7	12.00	0.065
chani	26.7	13.00	0.046
lama	20.0	14.33	0.055
oont	20.0	7.00	0.119
gargo	20.0	13.67	0.028
chitti_kiri	20.0	17.00	0.023
kunde_wale	20.0	8.33	0.103
khargosht	20.0	8.00	0.109
prindi	13.3	10.50	0.064
seya	13.3	12.00	0.036
bada	13.3	3.00	0.117
gidr	13.3	7.00	0.080
babl	13.3	2.00	0.117

Table 3: Trees (All Terms Listed 2 or More Times)

Item	Frequency (%)	Average Rank	Saliency
malta (Malta orange tree)	71.4	6.60	0.375
kikr	57.1	2.75	0.494
kava	57.1	4.50	0.364
pilai	42.9	5.67	0.298
kander	28.6	14.00	0.040
kikri	28.6	3.50	0.222
aru	28.6	8.00	0.152
tali	28.6	6.00	0.163

Plants.

We initially attempted to collect plant lists by sub-category. This was reasonably successful with trees, but did not generate particularly good results when we distinguished between cultivated crops and wild plants. The distinction is clearly there, but in a free listing context, farmers seemed unable to remember plants by such categories. By the time we asked farmers to generate these lists, they had already done a number of free lists on other categories of nature, so it may have been task fatigue. To their credit, they tried to carry out every task to the best of their ability, but none of the men that we asked to do this task attended school. We suspect that asking illiterate farmers to do repeated tasks which feel like academic tests or exams, may be more distracting than anticipated. It is perhaps necessary to ask a single individual to do only one or two free listing tasks in one sitting.

In the end, we wound up with usable free lists on plants from 8 men. The most frequently cited terms (*maki*=maize and *jondra*=a fodder plant) did not have the highest average ranking. Wheat (*gundum*), although only mentioned by 4 out of the 8 men, had the highest average rank of all the terms. There were more than 60 terms listed in total and many of these were particular varieties of specific plants. In particular, several people each listed more than one type of lentil, though interestingly, only two varieties of lentil were mentioned by two or more farmers (*mangni* and *masoor*). Grains and fodder appear to be the most important plants listed, though potato also appeared in 50% of the lists (see Table 4 for the complete list of all terms mentioned by two or more farmers).

Unfortunately, the usable number of lists from this exercise is very low. This probably means that there are few, if any, inferences possible about priorities, distribution or organisation of plant knowledge among this population of Punjabi farmers. This may be something that can be dealt with more adequately at a future time.

Table 4: Plants (All Terms Listed 2 or More Times)

Item	Frequency (%)	Average Rank	Saliency
maki (maize)	62.5	2.80	0.521
jondra (fodder plant)	62.5	4.20	0.422
gundum (wheat)	50.0	1.00	0.500
bajra (millet)	50.0	5.50	0.328
aloo (potato)	50.0	7.75	0.224
jawar (sorghum)	50.0	5.00	0.348
sarey	37.5	5.00	0.279
jaon	37.5	4.00	0.301
mangni (lentil)	37.5	10.00	0.129
matr (peas)	37.5	7.67	0.125
bangen (aubergine)	25.0	13.00	0.074
kanok	25.0	2.00	0.235
jamiyan	25.0	8.50	0.133
masoor (lentil)	25.0	12.00	0.082

Weather.

Perhaps the most surprising category of all was weather terms. After collecting 11 free lists on weather, we realized that respondents not only found this task confusing, but they genuinely seemed not to be able to list weather terms without prompts. There are, to be sure, considerably more terms for weather than those we collected, and both Lyon and Mughal have heard local farmers use these terms, but respondents appear to have found it difficult to recall the terms in the abstract. Since the total number of listed terms was 7 (once synonyms were collapsed), we have listed all terms even if mentioned by only a single respondent (see Table 5).

All respondents listed two categories of weather: *sardi* (cold) and *garmi* (hot). In some ways, this reflects the range of experienced weather in the region. Winters are very mild and temperatures rarely drop below 5°C. Summers are very hot and can reach the high 40s and even into the low 50s on occasion (°C). Rains are reportedly less predictable than in previous decades and do not occur in all months. The fifth term on the list, *bahar* (spring), is the name of the season in which the freelisting exercise was conducted. The term *acha* (good) is almost a synonym for *garmi* (hot). When asked what constituted *acha* weather, farmers replied *garmi*, however, this must be understood as a contextualised answer. We are not confident

that they would reply that *acha mosam* (good weather) equals *garmi mosam* in June or July when the heat is at its peak.

Table 5: Weather (All Terms Listed)

Item	Frequency (%)	Average Rank	Salience
garmi (hot)	100.0	1.36	0.883
sardi (cold)	100.0	1.91	0.706
barish (rain)	54.5	3.67	0.185
saf (clean)	18.2	3.50	0.076
bahar (spring)	18.2	5.00	0.052
acha (good)	18.2	3.00	0.083
sourij (sunny)	9.1	3.00	0.061

Animals in a Row Task.

Lyon carried out this task in a follow up visit to the village in 2015. He did it with 10 male farmers who grew up and lived in the region, though some of them had spent some time out of the village working in wage labor in nearby cities for limited periods of time. It was not possible to do this with any women. There appears to be a slight preference for using the relative Frame of Reference (FoR) (54%), though it may be that this would change when the test is conducted outside. In the three individuals who did this task outside, there was a clear preference for an absolute FoR (14/15 trials). The majority of participants were illiterate and had received no formal schooling at all (8/10). When the two literate participants were removed, there was only a slight decrease in the preference for relative FoR (52.5%) (see Table 6 for details of the results).

The starting direction of the animals and the order of the animals was changed for each trial. One participant objected to this and re-ordered the animals by size for each trial, though he seemed unconcerned with the direction each animal faced. The toy animals were a bull (*dand*), a ewe (*bheyr*) and a horse (*gora*). Each of the animals was immediately identified as not being local breeds. The farmers were familiar with the 'Australian' bull, but found the English ewe decidedly 'foreign'. The horse, although stockier and rounder than local horses, did not attract much comment from the participants. The animals were particularly lifelike and included obvious genitals so the farmers used specific sex terms to refer to each of the toy animals.

Conclusion.

The results presented here remain preliminary and subject to change following further analysis of the interview data and future data production. The richest source of data thus far has arguably been the interview data, in which it is possible to begin to develop a coherent cultural causal explanation of identified problems of climate change. Although the local causal model is at odds with global scientific explanations, it nevertheless places the blame squarely with human beings. Like the domin-

ant scientific model in the West, it attempts to incorporate technical and moral explanations.

Table 6: Animals-in-a-Row Task (N=10 Individuals x 5 Trials)

	Relativ	Absolute	Mixed-	Total				
Res	FoR	FoR	Facings	Trials	Age	Sex	Literat	Educ
1	5	0	0	5	24	M	Yes	Class 8
2	5	0	0	5	34	M	No	0
3	4	1	0	5	25	M	No	0
4	2	3	0	5	49	M	No	0
5	4	1	0	5	40	M	No	0
6	4	1	0	5	50	M	No	0
7	2	3	0	5	35	M	No	0
8	1	4	0	5	57	M	Yes	Class 10
9	0	5	0	5	30	M	No	0
10	0	5	0	5	30	M	No	0
	27	23	0	50	37.4	10 men	2 yes	8 no schooling
	54.0%	46.0%	0.0%			0 women	8 no	1 to 8 years
				Mean	34.5			1 to 10 years
				Median	35			

In the Western model, excessive carbon production and emission has led to changes in the composition of the Earth's atmosphere which disrupt patterns of heat flow. Excessive carbon emissions are a consequence of lavish energy consumption which many of the world's governments are attempting to frame as morally questionable. For local Punjab farmers in this part of northern Punjab, the mechanism for disrupting rains, in particular, is rooted in the omnipotent Allah who has the power, and authority, to deprive humans of rain or flood them with excessive rain at will. He does this because he is angry about the behavior of humans. The dominant reason given for Allah's anger is immorality in the cities which is being adopted by rural people. Some farmers blame Indian and Western cultures for spreading immoral, un-Islamic ideas and behaviors to the rural areas and triggering Allah's anger. The typical response to this anger is to say that people should pray more, both in the mosque as well as in local and regional shrines. The latter locations for praying are themselves cited as part of the cause of Allah's anger by farmers more heavily influenced by Wahabi or Salafi influenced schools of Islam, including the Deoband school which is the majority among Pukhtun groups. This remains a minority in rural areas and is correlated with higher education levels. The less formal education a person

has, the more likely he or she will be a follower of Barelvi Sunni Islam, a South Asian variety of Sufi Islam.

Free listing tasks produced mixed results. The free lists on soil types, animals and trees were reasonably extensive and informative. The one for plants is probably insufficient for inclusion in comparative analyses within this project. The free listing on weather, although clearly an inadequate reflection of the range of weather terms that Lyon and Mughal have heard in the village, is telling. The relatively short lists and the unanimous inclusion of the terms *garmi* and *sardi* (hot and cold), suggest that weather may be something that is not emphasised or prioritised by farmers because it may be perceived as too far beyond their control. The more elaborated vocabularies elicited on other topics all refer to domains in which individual farmers can make reasoned choices, but weather must be endured regardless of the impact on one's crops or comfort. This, like other matters, requires further study to generate and test plausible hypotheses for the drivers of such apparently restricted vocabularies.

The animals in a row task does not provide a clear FoR preference, beyond the possibility that performing the exercise outdoors may yield greater evidence of absolute FoR. Aside from this finding, there is insufficient data to infer any impact of literacy, age or caste on preferred FoR. The relative balance of absolute and relative FoR may suggest that members of this village, which 15 years ago was fairly detached from urban areas, have begun to adapt to greater mobility provided by an increase in the number of motor vehicles (motor cycles, cars, mini vans). In the late 1990s, there were villagers who rarely left the village, including some large landowners. At that time, a minority of the village children were pursuing education and the majority of those who did were only able to attend the state school in the village⁴. Today, almost every peasant farmer works at least part of the time for a wage, and they use this wage to pay for their children's education. Large landowning families educate their children entirely outside of the village which means that motor vehicles are far more regularly travelling back and forth between the village and urban centres as far as one hour away. All of this may well have effected the dominant FoR of even illiterate peasant farmers as they begin to experience greater mobility in a recently expanded sense of what constitutes their *ilaqa* or region.

There is much analysis yet to be done before it is possible to determine what model of nature might defensibly be proposed as dominant, but at present, there is some evidence to suggest that the most widespread model of the natural world involves a powerful supernatural domain, which includes Allah, as a sole God, plus, various non-human spirits or *jinn*, who can be both benign and malicious, and a bewildering array of spiritually powerful saints, or *pir-fakir*, to whom individuals can pray and seek some form of intervention. These *pir-fakir* do not themselves perform miracles, typically, but they are beloved by Allah and are somehow in a position to sway His actions in some people's favor. For Barlevi Sunni Muslims, this influence continues even after death, which means that the gravesite of powerful *pir-fakir* themselves become sites of religious worship and devotion. While this is arguably contrary to a literal interpretation of doctrinaire Islam, it is nevertheless remarkably widespread across the Muslim world and constitutes majority practice in South Asia.

The remainder of the 'natural' world, including non-human animals, plants, weather and so forth, appear to be part of the benevolent offering from God. So while there remain a number of questions to be answered in how inanimate and animate entities are related, there is no evidence to suggest widespread animist models of such things having independent relations to one another, as opposed to being the product of a single deity.

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Notes

- 1 Attock District at a Glance. 2015. Islamabad, Pakistan. [http://www.pbs.gov.pk/sites/default/files//tables/District at a glance Attock.pdf](http://www.pbs.gov.pk/sites/default/files//tables/District%20at%20a%20glance%20Attock.pdf).
- 2 Bollywood is the nickname given to the Mumbai film industry.
- 3 See Abbi (1985) on the distribution of reduplicative structures (RS) present across all South Asian language groups. Abbi argues that modernization is 'killing' RS in more 'developed' languages like Punjabi, so this pattern of nonsensical rhyming may be a residual consequence of an earlier semantically meaningful RS.
- 4 See Lyon (2004b) for a brief description of some of the problems of schools in this area in the late 1990s. In particular, the village school was run by a brutal teacher who frequently failed to show up and seemed to spend an alarming amount of the school day taking extended tea breaks in the village tea shop.