

Appendix I: Shifting cultivators in India								Consumed (C), grown (G), grown via shifting cultivation (SC)		
State	District	Vegetation Zone	Ethnic Group	Language	Comments	Reference	Staple foods	Rice	Millet	Tubers
Andhra Pradesh	Adilabad	Dry Deciduous (Terminalia- Anogeissus- Tectona)	Gond	D	Now taken to settled cultivation	Singh 1994a				
Andhra Pradesh	Visakhapatnam, Vizianagaram, Srikakulam and East Godowari	Dry-to-Moist Deciduous (Terminalia- Anogeissus- Cleistanthus)	Konda, Dora	D	Now settled agriculturalists.	Singh 1994a	Rice.	(C)		
Andhra Pradesh	Visakhapatnam, Vizianagaram and Srikakulam.	Dry-to-Moist Deciduous (Terminalia- Anogeissus- Cleistanthus)	Konda, Kapu	D	Hunter-gatherers and shifting cultivators	Singh 1994a				
Andhra Pradesh	Khammam	Moist/Dry Deciduous (Shorea- Terminalia-Adina)	Konda, Reddi	D		Singh 1994a	Sorghum, roots and tubers.			(C)
Andhra Pradesh	Visakhapatnam, Srikakulam and Vizianagaram	Dry-to-Moist Deciduous (Terminalia- Anogeissus- Cleistanthus)	Mukha Dora	D	Also sell forest produce	Singh 1994a	Ragi and rice, pulses.	(C)		
Andhra Pradesh	Srikakulam and Vizianagaram	Dry-to-Moist Deciduous (Terminalia- Anogeissus- Cleistanthus)	Jatapu/ Jatapu Dora	UU	Settled, shifting and terrace cultivation	Singh 1994a				
Andhra Pradesh	Srikakulam, Vizianagaram and Visakhapatnam	Dry-to-Moist Deciduous (Terminalia- Anogeissus- Cleistanthus)	Kondh	UU		Singh 1994a				

Andhra Pradesh	Visakhapatnar, Visianagaram and Srikakulam	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Kotia	UU	Settled and shifting agriculture in the hills. Also practice animal husbandry	Singh 1994a				
Andhra Pradesh	Godavari River	Dry Deciduous (Terminalia-Anogeissus-Tectona)	Koya, Konda, Rajulu	UU	Now sell herbal medicines	Singh 1994a				
Andhra Pradesh	Vishakhapatnam	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Kuliya	UU	Settled and shifting cultivation	Singh 1994a	Rice.	(C)		
Andhra Pradesh	Srikakulam	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Saora, Kapu	UU	Most now depend on settled cultivation, wage labour and firewood selling	Singh 1994a	Millets (cholu, samalu, korralu) and rice.	(C)	(C)	
Andhra Pradesh	Visakhapatnam	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Valmiki	UU	Shifting and terrace cultivation	Singh 1994a	Ragi, jawar and rice.	(C)		
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Howa	IE		Singh 1994a, 1995a	Rice, maize and millet	(C) (SC)	(SC)	
Arunachal Pradesh	East Siang	Montane Wet Temperate	Adi, Ashing	ST	Shifting and terrace cultivation	Singh 1994a, 1995a	Rice, maize, millet, some leafy vegetables, seasonal fruits.	(C)	(C)	
Arunachal Pradesh	East and West Siang, Upper Subansiri	Montane Wet Temperate	Adi, Gallong/ Galong	ST	Wet rice cultivation and horticulture recently adopted	Singh 1994a, 1995a	Rice, maize, millet, some leafy vegetables, seasonal fruits.	(C)	(C)	
Arunachal Pradesh	East Siang, Mariyang subdivision	Montane Wet Temperate	Adi, Milang/ Millang	ST	Shifting and wet rice cultivation	Singh 1994a, 1995a	Rice, maize, millet, local pulses, wheat.	(C)	(C)	
Arunachal Pradesh	West Siang	Montane Wet Temperate	Adi, Pailibo	ST		Singh 1994a, 1995a				

Arunachal Pradesh	West Siang	Montane Wet Temperate	Adi, Ramo	ST		Singh 1994a, 1995a	Rice, maize, vegetables and pulses.	(C)		
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Aka	ST	Subsidiary collection of forest produce	Mehta 2004. Singh 1994a, 1995a	Maize, millet, rice and local pulses.	(C) (SC)	(SC)	(SC)
Arunachal Pradesh	West Siang	Montane Wet Temperate	Memba	ST	Shifting and wet cultivation.	Singh 1994a, 1995a	Rice, maize, millet, locally available vegetables, fruits, cucumber, beans, pumpkins, potatoes, chili.	(C)	(C)	
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Miji	ST	Shifting, terrace and wet paddy cultivation	Singh 1994a, 1995a				
Arunachal Pradesh	East Siang	Montane Wet Temperate	Mishing	ST	Were hunter, gatherer, fisher and trappers. Now practice shifting cultivation. Also grow pineapple and betel nut.	Singh 1994a, 1995a				
Arunachal Pradesh	Lohit	Montane Wet Temperate	Mishmi, Digaru	ST	Shifting as well as terrace and wet cultivation.	Singh 1994a, 1995a		(G)	(G)	
Arunachal Pradesh	Dibang Valley	Montane Wet Temperate	Mishmi, Idu	ST	Shifting and settled cultivation.	Singh 1994a, 1995a	Rice, millet, maize, pulses and vegetables.	(C)	(C)	
Arunachal Pradesh	Lohit	Montane Wet Temperate	Mishmi, Miju	ST	Now occupied in horticulture and government jobs.	Singh 1994a, 1995a	Maize, millet, pulses, rice and wheat.	(C)	(C)	
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Monpa, But	ST	Settled and shifting. Have started cultivating apples	Singh 1994a, 1995a	Maize, wheat, millet, buckwheat, rice, pulses and vegetables.	(C)	(C) (G)	
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Monpa, Diranh	ST	Shifting, terrace and wet paddy cultivation.	Singh 1994a, 1995a	Maize, rice, millet, wheat and buckwheat.	(C)	(C)	
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Monpa, Kalaktang	ST	Shifting, terrace and wet paddy cultivation.	Singh 1994a, 1995a	Rice, maize, millet and leafy vegetables.	(C)	(C)	
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Monpa, Lishpa	ST	Shifting and settled cultivation.	Singh 1994a, 1995a	Rice, barley, millet, wheat and buckwheat.	(C)	(C)	
Arunachal Pradesh	Tawang	Montane Wet Temperate	Monpa, tawang	ST	Slash and burnt, terrace and wet paddy cultivation.	Singh 1994a, 1995a	Cereals.			
Arunachal Pradesh	Lower Subansiri	Montane Wet Temperate	Nishi	ST	Horticulture and animal husbandry subsidiary	Singh 1994a, 1995a	Rice, wheat, maize and millet.	(C)	(C)	

Arunachal Pradesh	Tirap	Montane Wet Temperate	Nocte	ST	Also adopted wet and terrace cultivation.	Singh 1994a, 1995a	Rice, millet, cereals and vegetables.	(C)	(C)	
Arunachal Pradesh	West Kameng	Montane Wet Temperate	Sherdukpen	ST	Shifting, terrace and wet paddy cultivation	Singh 1994a, 1995a	Buckwheat, millet, maize and other cereals, vegetables, soya beans, leafy vegetables, seasonal fruit and rice.	(C)	(C)	
Arunachal Pradesh	East Kameng and Lower Subansiri	Montane Wet Temperate	Sulung	ST	Hunting and gathering, fishing, trapping, shifting cultivation and wage labour.	Singh 1994a, 1995a	Rice, maize, millet, wild sago palm and vegetables.	(C)	(C)	
Arunachal Pradesh	Upper Subansiri	Montane Wet Temperate	Tagin	ST	Slash and burn agriculture	Singh 1994a, 1995a	Rice and vegetables.	(C)		
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Havi	ST	Shifting hill cultivation. Settled farming and wet cultivation in the plains.	Singh 1994a, 1995a	Rice, maize, millets and pulses.	(C)	(C)	
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Jugli	ST	Slash and burn agriculture	Singh 1994a, 1995a	Rice.	(C)		
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Kimsing	ST	Started settled farming	Singh 1994a, 1995a	Rice, maize and vegetables.	(C)		
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Lungphi	ST	Settled agriculture practised on flat lands.	Singh 1994a, 1995a	Rice.	(C)		
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Lungri	ST	Slash and burn agriculture, recently engaged in wet rice cultivation	Singh 1994a, 1995a	Rice, maize, millet, local pulses, fruits, roots, tubers and vegetables.	(C)	(C)	(C)
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Morang	ST	Wet rice cultivation has now replaced traditional practice of slash and burn	Singh 1994a, 1995a				
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Mosang	ST		Singh 1994a, 1995a	Rice, vegetables, pulses, roots, tubers and fruits.	(C)		(C)
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Muklom	ST	Slash and burn cultivation	Singh 1994a, 1995a	Rice.	(C)		
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Tonglim	ST		Singh 1994a, 1995a	Rice, maize, pulses and vegetables.	(C)		
Arunachal Pradesh	Changlang	Montane Wet Temperate	Tangsa, Yongkuk	ST	Shifting and settled cultivation	Singh 1994a, 1995a	Rice, millet and maize.	(C)	(C)	

Arunachal Pradesh	Tirap	Montane Wet Temperate	Wancho	ST	Slash and burn cultivation. Recently adopted terrace and wet cultivation.	Singh 1994a, 1995a	Rice, millet and vegetables.	(C)	(C)	
Arunachal Pradesh	East Siang	Montane Wet Temperate	Minyong	UU		Jagirdar 1987		(SC)		
Assam	Jantia Hills	Tropical Moist Deciduous	Jaintia	AA		Singh 1994a				
Assam	Barak valley	Tropical Wet Evergreen	Kachari, Barman	IE	Shifting and wet cultivation.	Singh 1994a	Rice.	(C)		
Assam	North Cachar, Kabi Anglong	Tropical Wet Evergreen	Kachari, Dimso	IE	Slash and burn	Singh 1994a	Rice.	(C)		
Assam	North Cachar and Cachar	Tropical Wet Evergreen	Hmar	ST	Many are landless.	Singh 1994a				
Assam	Sibsagar	Tropical Wet Evergreen	Naga, Konyak	ST	Now occupied in sharecropping and wage labour.	Singh 1994a				
Assam	Karbi Anglong	Tropical Wet Evergreen	Naga, Rengma	ST	Wet cultivation and shifting cultivation.	Singh 1994a	Rice.	(C)		
Assam	North Cachar, Karbi Anglong and Cachar	Tropical Wet Evergreen	Kuki	UU		Singh 1994a				
<i>Central India</i>		Dry-Moist-Deciduous (mostly)	Gond?	D	Some cultivate government land	Singh 1994a				
Chattisgarh	Raigarh	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Asur	AA		Singh 1994a				
Chattisgarh	Surguja, Raigarh and Bilanpur	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Korwa	AA	Now settled agriculturalists.	Singh 1994a	Rice, wheat and jowar.	(C)		

Chattisgarh	Bastar	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Gond, Abuj Maria	D		Singh 1994a	Rice, maize, roots, tubers, leaves, pulses (kulthi and urad)	(C)		(C)
Chattisgarh	Bastar	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Gond, Bison Horn Maria	D	Roots and tubers from forest	Singh 1994a	Rice, pulses (kulthi and urad), roots, tubers, local seasonal fruit and vegetables.	(C)		(C)
Chattisgarh	Raipur	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Kamar	D	Shifting cultivation and basketry	Singh 1994a	Rice and madia.	(C)		
Chattisgarh	Bastar	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Bhatras	IE	"...giving up their very modified form of shifting cultivation" in favour of permanent rice fields.	Grigson 1949	Rice.	(C)		
Chattisgarh	Bilaspur	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Majhwar	UU	Now settled cultivators	Singh 1994a	Rice and wheat, wild roots and tubers, leaves and fruits.	(C)		(C)
Chattisgarh	Surguja and Raigarh	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Nagesia	UU	Now settled agriculturalists and wage laborers.	Singh 1994a	Rice, wheat, jowar and bajra.	(C)		
Chattisgarh	Bilaspur	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Saunta	UU	Shifting and settled cultivation.	Singh 1994a	Rice, millet and other grains, roots and tubers.	(C)	(C)	(C)

Haveli	Dadra and Nagar	Moist/Dry Deciduous (Tectona-Terminalia)	Kokna	IE	Now terraced cultivation	Singh 1994a				
Jharkhand	Gumla and Lohardaga	Moist Deciduous (Shorea)	Asur/Bir Asur	AA	Iron workers once engaged in shifting cultivation	Singh 1994a	Wheat, rice, sorghum and maize	(C)		
Jharkhand	Palamau, Ranchi and Hazaribagh	Moist Deciduous (Shorea)	Parhaiya	UU	Used to practice slash and burn agriculture.	Singh 1994a				
Jharkhand/Bihar	Chotanagpur plateau	Moist Deciduous (Shorea)	Birja	AA	Shifting being replaced by settled cultivation	Singh 1994a	Rice, mahua lattha, makai ghata, pulses, roots, fruits and tubers.	(C)		(C)
Jharkhand/Bihar	Sahebganj and Godda	Moist Deciduous (Shorea)	Sauria Pahariya	D	Shifting and terrace agriculture	Singh 1994a	Rice, maize, millet, jowar, pulses, roots and tubers, locally available vegetables and fruits.	(C)	(C)	(C)
Karnataka	Mysore	Dry Deciduous (Terminalia-Anogeissus-Tectona)	Soliga/Soligaru	D	Now forest and agricultural laborers	Singh 1994a	Tubers, kulthi, beans.			(C)
Kerala	Palghat	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Irular	D		Singh 1994a				
Kerala	Trivandrum	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Kanikkar	D	Shifting cultivation, hunting and gathering was practiced. Now settled cultivation predominates.	Singh 1994a				
Kerala	Kottayam, Idukki and Patanamthitta	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Kochu Velan	D	Now settled agriculture and animal husbandry	Singh 1994a	Rice.	(C)		

Kerala	Wayanad	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Kurichian/Kurichchian	D	Traditionally shifting cultivators and hunters, now mostly settled cultivators and agricultural laborers.	Singh 1994a	Rice, gram, tur, urad and moog, roots and tubers.	(C)		(C)
Kerala	Wayanad	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Kuruman, Mullu	D	Now settled cultivators	Singh 1994a	Rice.	(C)		
Kerala	Palakkad	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Maka Malasar	D	Were shifting cultivators and hunter-gatherers, now hunter-gatherers and laborers. Only 9 individuals recorded	Singh 1994a	Used to consume ragi, horse gram, maize, cassava, wild roots and tubers. Now consume rice.	(C)		(C)
Kerala	Idukki and Kottayam	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Malai Arayan	D	Now settled cultivators and laborers	Singh 1994a				
Kerala	Idukki	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Mannan	D	Now occupied in settled cultivation, labour and animal husbandry.	Singh 1994a	Ragi, rice, roots and tubers, gram, tur, peas and beans.	(C)		(C)
Kerala	Idukki, Palghat and Trichur	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Muthuvan	D	Shifting and terrace cultivation. Notably irrigate cultivated lands (sourcing water from springs and streams)	Singh 1994a	Rice, ragi, wild yams, roots and tubers, locally available pulses and vegetables.	(C)		(C)
Kerala	Idukki	Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Hill Pulya, Kurumba	UU		Singh 1994a	Rice, ragi, pulses, roots and tubers.	(C)		(C)



Kerala and Tamil Nadu		Moist Deciduous (Tectona-Dillenia-Lagerstromia-Terminalia paniculata)	Uraly	D	Now settled agriculture and wage labour. Iyer (1939) described them as nomadic agriculturalists	Singh 1994a	Rice.	(C)		
Madhya Pradesh, Chhattisgarh and Jharkhand	(Concentrated in Mandla)		Baigas	AA		Prasad 1995		(G)		
Mainpur	<i>South</i>	Tropical Moist Deciduous	Paite	ST		Singh 1998	Rice. Used to eat maize supplemented with millet, beans, corn and sweet potato.	(C)	(C)	
Manipur	Chandel, Senapati and southern districts	Tropical Moist Deciduous	Aimol	ST		Singh 1998	Rice.	(C)		
Manipur		Tropical Moist Deciduous	Anal	ST	Land for shifting cultivation is owned by members of each of the major subdivisions collectively while terrace fields for swidden cultivation are owned by individuals	Singh 1998	Previously consumed maize. Now consume rice and occasionally pulses.	(C)	(C)	
Manipur		Tropical Moist Deciduous	Chiru	ST	Landowning, shifting and wet cultivation	Singh 1998	Rice.	(C)		
Manipur	Chandel	Tropical Moist Deciduous	Chote/ Chothe	ST	Shifting and wet cultivation	Singh 1998				
Manipur	<i>South</i>	Tropical Moist Deciduous	Gangte	ST	Forest produce spec. young shoots of cane and tubers sold in local markets	Singh 1998	Rice, maize, corn, millet and vegetables.	(C)	(C)	
Manipur	Senapati	Tropical Moist Deciduous	Koirao	ST	Shifting and wet cultivation	Singh 1998	Rice.	(C)		
Manipur	Senapati and Lamphal	Tropical Moist Deciduous	Koireng	ST	Slash and burn and wet cultivation	Singh 1998		(G)		

Manipur	Churachandup, Tamenglong and Senapati	Tropical Moist Deciduous	Kom	ST	Hill dwellers engage in shifting cultivation, plains dwellers in plough cultivation	Singh 1998	Rice, vegetables, roots and tubers from the forest.	(C)		(C)
Manipur	Chandel	Tropical Moist Deciduous	Lamgang	ST		Singh 1998				
Manipur	Chandel	Tropical Moist Deciduous	Moyon	ST		Singh 1998	Rice.	(C)		
Manipur	Tamenglong	Tropical Moist Deciduous	Naga, Kacha	ST	Shifting and wet cultivation.	Singh 1998	Rice.	(C)		
Manipur	<i>East</i>	Tropical Moist Deciduous	Naga, Tangkhul	ST	Shifting cultivation gradually being replaced by terrace cultivation by those who live near the hill slopes.	Singh 1998	Rice, peas and beans.	(C)		
Manipur	Chandel and southern districts	Tropical Moist Deciduous	Zou	ST	Shifting cultivation. Slash and burn cultivation	Singh 1998	Rice.	(C)		
Manipur	<i>South</i>	Tropical Moist Deciduous	Hamr	UU	Land belongs to village chief	Singh 1998				
Meghalaya	Garo Hills; Khasi Hills	Tropical Moist Deciduous	Garro	ST	Plains dwelling Garro practice wet cultivation of rice, jute and mustard seed	Singh 1994b	Rice, millet, maize and roots.	(C)	(C)	
Meghalaya	Jaintia and East Khasi Hills	Tropical Moist Deciduous	Karbi	ST	Wet rice cultivation in plains.	Singh 1994b	Rice, pulses and vegetables.	(C)		
Meghalaya	Jaintia Hills	Tropical Moist Deciduous	Mizo, Biate	ST	Wet cultivate small plots of land, otherwise shifting cultivation	Singh 1994b				
Mizoram	Aizawl	Tropical Wet Evergreen	Pnar	AA	Hunting and gathering, production of betel leaves and slash and burn (jhum)	Singh 1994a, 1995b	Rice, wheat, maize, different kinds of lentils, gram, tur, urad, moongg, masur and market vegetables. Market oranges, jack fruit, banana and tamarind.	(C)		
Mizoram	Aizawl	Tropical Wet Evergreen	Hmar	ST		Singh 1994a, 1995b	Rice, brinjal, tomato, potato.	(C) (SC)		(SC)

Mizoram	Chhimitupui, Lunglei and Aizawl	Tropical Wet Evergreen	Mizo, Bawm	ST		Singh 1994a, 1995b	Rice. Moong, masur, beans, brinjal, lady's finger, tomato, roots, tubers, orange, papaya and banana.	(C)		(C)
Mizoram	<i>North-east</i>	Tropical Moist Deciduous	Mizo, Biate	ST	Slash and burn. Roots and tubers from the forest	Singh 1994a, 1995b	Rice. Masur, moong, beans, brinjal, cabbages, ladies finger, tomato and other vegetables, papaya, bananas, orange	(C) (SC)		
Mizoram	Aizawl	Tropical Wet Evergreen	Mizo, Hualngo	ST	Also practice wet cultivation in the valleys.	Singh 1994a, 1995b	Rice and maize, vegetables, pulses, fruits, mustard leaves, pumpkin leaves, yam, roots and herbs.	(C) (G)		
Mizoram	Throughout the state	Tropical Wet Evergreen/ Deciduous	Mizo, Lusei	ST	Also weave, make baskets and pottery. Orchard land is individually owned	Singh 1994a, 1995b	Rice and millet. Vegetables, leafy vegetables, edible roots and herbs, mango, orange, banana, pineapple, theheipui, thei huawt, pulses (daihluan, musur dal) ubekang, bean.	(C) (G)	(C) (G)	
Mizoram	<i>South and south-east</i>	Tropical Moist Deciduous	Mizo, Mara	ST	Wet cultivation on the plain (rice)	Singh 1994a, 1995b	Rice, maize, millet, pulses, musur dal, soybean, roots and tubers (bia, thobia, thohy), potato, brinjal, cucumber, green banana, banana, mango, orange	(C) (G)	(C)	(C)
Mizoram	Chhimitupui, Aizawl	Tropical Wet Evergreen	Mizo, Pawi	ST	Also engaged in weaving and basketry	Singh 1994a, 1995b	Rice, maize, fruits, roots, vegetables.	(C) (G) (SC)		

Mizoram	Aizawl, Lunglei and Chhimituipui	Tropical Wet Evergreen	Mizo, Ralte	ST	Hill cultivation	Singh 1994a, 1995b	Rice. Masur, moong, vegetables, mustard leaves, bean, bean leaves, brinjal, cabbage, potato, tomato, papaya, orange, banana	(C) (G) (SC)		
Mizoram	Aizawl, Lunglei and Chhimituipui	Tropical Wet Evergreen	Mizo, Tlau	ST	Slash and burn, shifting cultivation	Singh 1994a, 1995b	Rice, roots and tubers.	(C) (SC)	(SC)	(C)
Mizoram	Aizawl, Chhimituipui and Lunglei	Tropical Wet Evergreen	Riang	ST	Slash and burn, shifting cultivation.	Singh 1994a, 1995b	Rice, brinjal, cabbage, cauliflower, gourd, bamboo shoots, wild shoots (bangre and ritum), market bought dailo (pulse), plantain, pineapple, mango, papaya and sugarcane	(C)		
Nagaland	Dimapur	Mountain Wet Temperate	Kachari	IE	Also practice plough cultivation	Singh 1994a, b	Rice, pulses, oilseeds, roots, vegetables, pineapple, guava, banana, orange etc.	(C)		
Nagaland	Kohima	Mountain Wet Temperate	Garo	ST	Some practice shifting agriculture. Used to collect tubers from the forest (1980s). Some oral evidence suggests that yams and roots were grown in 'the olden days' (Roy 1981)	Singh 1994a, b, Roy 1981	Rice.	(C)		
Nagaland	Ghaspani and Dimapur	Mountain Wet Temperate	Kuki	ST		Singh 1994a, b	Rice and pulses, naga dal, potato, bean, cabbage, mustard leaf, roots, guava, pineapple.	(C)		

Nagaland	Kohima	Mountain Wet Temperate	Naga, Angami	ST	Primarily depend upon wet terrace cultivation.	Singh 1994a, b	Rice, naga dal, a wide variety of roots and tubers (taro, kachu), millet, bamboo shoots, jungle fruits and leafy vegetables. New food items include carrots, beans, brinjals, radish, cauliflowers, peas, tomatoes, pineapples, mango, guava, papaya and other tropical fruits.	(C)	(C)	(C)
Nagaland	Mokokchung	Mountain Wet Temperate	Naga, Ao	ST	Shifting and settled cultivation.	Singh 1994a, b	Rice, naga dal, jungle fruits and leafy vegetables.	(C)		
Nagaland	Phek	Mountain Wet Temperate	Naga, Chakhesang	ST	Primarily depend upon wet terrace cultivation.	Singh 1994a, b	Rice, maize, millet and a local pulse.	(C)	(C)	
Nagaland	Tuensang	Mountain Wet Temperate	Naga, Chang	ST	Shifting cultivation and animal husbandry.	Singh 1994a, b	Rice, millet, chili, roots and tubers, naga dal, leafy vegetables and banana.	(C)	(C)	(C)
Nagaland		Mountain Wet Temperate	Naga, Kabui	ST	Rural Rongmei practice slash and burn.	Singh 1994a, b				
Nagaland	Tuensang	Mountain Wet Temperate	Naga, Khiamnagan	ST		Singh 1994a, b	Rice, chili, ginger, naga dal, millet, job's tear, corn, roots and market bought beans.	(C)	(C)	
Nagaland	Mon	Mountain Wet Temperate	Naga, Konyak	ST		Singh 1994a, b	Rice, job's tear, maize, naga dal, vegetables, fruits, tubers, potato and pulses.	(C)		(C)
Nagaland	Workha	Mountain Wet Temperate	Naga, Lotha	ST	Slash and burn agriculture is primary. Also wet-rice cultivation in foothills and valleys.	Singh 1994a, b	Rice, bamboo shoot, kachu taro, pulses, naga dal, millet, maize, banana, orange, potato and wild tubers.	(C) (G) (SC)	(C) (G)	(C)

Nagaland	Tuensang	Mountain Wet Temperate	Naga, Phom	ST	Slash and burn.	Singh 1994a, b	Rice, maize, millet, yam, vegetables and wild roots.	(C)	(C) (SC)	(SC)
Nagaland	Phek	Mountain Wet Temperate	Naga, Pochury	ST	Slash and burn, supplemented by terrace agriculture.	Singh 1994a, b	Rice, chili, ginger, millet, naga dal, corn, job's tears and roots (aphie).	(C)	(C)	
Nagaland	Kohima	Mountain Wet Temperate	Naga, Rengma	ST		Singh 1994a, b	Rice, millets, barley, green vegetables, taro, bamboo shoots, sweet potato, wild tubers, potato, job's tears and ginger.	(C) (SC)	(C) (SC)	(C)
Nagaland		Mountain Wet Temperate	Naga, Sangtam	ST		Singh 1994a, b	Rice, millet, job's tears, ginger, chili, naga dal, roots and tubers, jungle vegetables and banana.	(C)	(C)	(C)
Nagaland		Mountain Wet Temperate	Naga, Sema	ST	Slash and burn cultivation.	Singh 1994a, b	Rice, millet, job's tear, taro, pulses, banana, apple, pineapple and wild fruits.	(C) (SC)	(C) (SC)	
Nagaland	Tuensang	Mountain Wet Temperate	Naga, Yimcjunger	ST		Singh 1994a, b	Rice, millet, leafy vegetables, pulses, roots, potato and fruits.	(C)	(C)	
Nagaland	Kohima	Mountain Wet Temperate	naga, Zeliang	ST	Shifting and terrace.	Singh 1994a, b	Rice.	(C)		
Nagaland, Manipur, Assam		Mountain Wet Temperate	Naga	ST	Shifting and terrace cultivation. Kitchen gardens produce: cole crops, roots, bulbs, beans etc.	Singh 1994c		(G)	(G)	
Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Bondo/Bonda	AA		Mohanty 2004, Singh 1994a, Patnaik 2005	Ragi, rice, roots and tubers, fruits (mango, banana, jackfruit, berries, tamarind), maize, vegetables, chili, millet.	(C) (G)	(C)	(C)

Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Didayi	AA	Shifting cultivation in the hills. Didayi from plains now practice settled agriculture	Singh 1994a, Patnaik 2005	Rice, ragi, pulses (peas and beans) niger seed, roots, tubers, cucumber, beans, green leaves, cereals, bamboo shoots	(C) (G)	(G)	(C)
Orissa	Keonjhar and Dhenkanal	Moist/Dry Deciduous (Shorea-Dillenia-Pterospermum)	Juang	AA	Wet land and shifting cultivation employed. Samualls (1856), Dalton (1872) and Hunter (1877) record the Juang as NOT shifting cultivators.	Singh 1994a, Patnaik 2005	Rice and ragi, fruits, tubers and roots, beans and moong dal.	(C) (G)		(C) (G)
Orissa	<i>Throughout the state</i>	Moist/Dry Deciduous	Saora	AA	Shifting and terrace cultivation.	Singh 1994a	Rice, ragi, millet, pulses and vegetables, roots, fruits and tubers collected from the forest.	(C)	(C)	(C)
Orissa	Ganjam and Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Saora, Lanja	AA	Shifting and wet terraced cultivation	Singh 1994a, Patnaik 2005	Rice, millet and pulses, some edible leaves.	(C) (G) (SC)	(C)	
Orissa	Koraput; Ganjam, Kalahandi, Sundargarh	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Gadaba	D	Also located in agency area, Andhra Pradesh and Bastar district, Madhya Pradesh	Singh 1994a	Rice, ragi	(C)		
Orissa	West	Moist Deciduous (Shorea-Buchanania-Cleistanthus)	Gond	D		Singh 1994a				
Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Jatapu/Pandara Kula Chatriya	D	Settled and shifting cultivation	Singh 1994a				
Orissa	Kandhamal	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Kond, Kutia	D		Patnaik, 2005	Rice, millets, vegetables, mango.	(C)	(C) (G)	

Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Konda, Dora	D	Shifting cultivation is primary occupation	Singh 1994a				
Orissa		Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Kondh	D	Engaged in shifting agriculture, settled agriculture and animal husbandry.	Singh 1994a	Ragi and rice.	(C)		
Orissa	Cuttach, Koraput and Kalahandi	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Kondh, Dangria	D	Mainly grow fruit, shifting cultivation used to be practiced extensively.	Singh 1994a, Patnaik 2005	Ragi, rice, jowar and kosora, pulses, fruits, roots and tubers.	(C)		(C) (G)
Orissa	Kalahandi	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Kondh, Dongaria	D	Shifting cultivation, plains land cultivation and horticulture	Seeland and Schmithüsen 2002	Ragi, rice, sweet potato, yam, leafy vegetables, fruits and maize.	(C) (G)	(C)	(C) (G)
Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Kondh, Kuwi	D	Terrace and shifting cultivation	Singh 1994a				
Orissa	Kondha	Dry-to-Moist Deciduous (Terminalia-Anogeissus-Cleistanthus)	Kondh, Sitha	D	Largely landless, but some shifting and some settled cultivation	Singh 1994a	Rice, seasonal fruits.	(C)		
Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Koya	D		Singh 1994a				
Orissa	Koraput and Kalahandi	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Paroja, Pengo	D		Singh 1994a	Rice, ragi, maize, barley.	(C)		



Orissa	Keonjhar, Dhenkanal, Sundargarh	Moist/Dry Deciduous (Shorea-Dillenia-Pterospermum)	Bhunya, Paudi	IE	Shifting and settled. Forest collection is highly important, poorer families depend on forest produce for half the year	Singh 1994a, Patnaik 2005	Fields: Rice, black gram, niger, mustard, maize, ragi, suan, gulchi, kangu, green leaves, vegetables, mushrooms, tubers. Trees: jackfruit, mango, tamarind. Forest: tubers, rhizomes, leaves and shoots, fruits, flowers (mahua), seeds (mahua), grains, mushrooms, harida, anala, sal seed, kusum.	(C) (G) (SC)	(G)	(C)
Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Paroja	IE	Shifting cultivation on hill slopes, plough cultivation on flat fields and irrigated terraces.	Singh 1994a	Ragi, rice.	(C)		
Orissa	Mayurbhanj, Keonjhar	Moist/Dry Deciduous (Shorea-Dillenia-Pterospermum)	Bathudi	UU	Discontinued shifting cultivation since last century	Singh 1994a	Rice, pulses and several leafy vegetables.	(C)		
Orissa	Keonjhar, Sundargarh, Mayurbhani, Sambalpur	Moist/Dry Deciduous (Shorea-Dillenia-Pterospermum)	Bhuinya/Bhuiya	UU	Shifting and settled agriculture, hunting. Weekly markets	Singh 1994a, Patnaik 2005	Rice, pulses- gram and pigeon pea.	(C)		
Orissa	Kalahandi	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Bunja (Chuktia)	UU	Shifting and low-land paddy cultivation.	Patnaik 2005	Rice, <i>kendu</i> , mango, jack fruit, <i>mohua</i> , tamarind and <i>jamun</i> .	(C) (G)		
Orissa	Koraput	Moist/Dry Deciduous (Shorea-Terminalia-Adina)	Mali	UU	Both settled and shifting	Singh 1994a	Rice, maize and ragi.	(C)		
Tamil Nadu	Nilgiri Hills	Montane Wet Evergreen (Shola)	Kota	D	Shifting and settled agriculture. Also animal husbandry	Singh 1994a	Rice, jowar, ragi, pulses and vegetables.	(C)		

Tamil Nadu	Coimbatore	Moist Deciduous (Tectona-Dillenia- Lagerstromia- Terminalia paniculata)	Muduvan	D	Slash and burn cultivation and horticulture practiced in the reserve forests. Produce cardamom and lemon-grass	Singh 1994a				
Tripura	North and West Tripura	Tropical Moist Deciduous	Khasia	AA		Singh 1996	Rice, vegetables, pulses, roots and tubers	(C)		(C)
Tripura	North	Tropical Moist Deciduous	Chakma	IE		Singh 1996	Bamboo shoots, moong, masur, potatoes, onions, cabbages, roots and tubers, wild <i>panalu</i> , wild <i>thadalu</i> .	(G)		(C)
Tripura	South Tripura	Tropical Moist Deciduous	Jamatia	ST	Shifting cultivation of undulating hills under government control. Wet cultivation on the plains is secondary.	Singh 1996	Rice, bamboo shoots, potato, gourd, onions, vegetables ( <i>arai</i> ), tubers ( <i>batema</i> ), fruits ( <i>thaiserem</i> ), beans, moong, masur.	(C)		(C)
Tripura		Tropical Moist Deciduous	Kuki	ST		Singh 1996	Rice, maize, moong, masur, peas, beans, local roots, local fruits and local vegetables.	(C)		
Tripura	South Tripura	Tropical Moist Deciduous	Mag	ST	Now plough cultivators	Singh 1996	Rice, bamboo shoots, pulses, local vegetables ( <i>snakang</i> ), jackfruit, pineapple, tubers ( <i>mroiloi</i> , <i>mrongmui</i> ).	(C) (G)		(C) (G)
Tripura	West Tripura	Tropical Moist Deciduous	Tripuri	ST	Largely settled cultivation, some slash and burn still practiced	Singh 1996	Rice, masur, moong, urad, gram, khesari, locally available roots and tubers, vegetables and fruits.	(C)		(C)

Tripura	South and West	Tropical Moist Deciduous	Halam, Kaipeng	UU	Also rear domestic animals	Singh 1996	Rice., bamboo shoots, masur, matar, potatoes, onions, wild vegetables like <i>ancham</i> , wild tubers like <i>thingkui</i> , wild fruits like <i>jangmani</i> , mango, jackfruit and pineapple.	(C)		(C)
Tripura	South and West	Tropical Moist Deciduous	Halam, Kaloï	UU	Also rear poultry. Shifting cultivation lands owned by government. Plains lands are individually owned.	Singh 1996	Rice. Bamboo shoots, potatoes, onions, vegetables, tubers, wild fruit ( <i>arai, thalamar, thaipang</i> ) monng, masur, beans.	(C) (G) (SC)		(C)
Tripura	South Tripura	Tropical Moist Deciduous	Halam, Molsom	UU	Some have adopted plough cultivation or cultivate on a share cropping basis.	Singh 1996	Rice, vegetables and pulses (gram, lentil).	(C)		
Tripura	West Tripura	Tropical Moist Deciduous	Halam, Rupini	UU	Adopted settled cultivation in recent years. Also rear goats and poultry to supplement income.	Singh 1996	Rice, bamboo shoots, potatoes, onions, vegetables ( <i>gantha, chichiri</i> ), tubers ( <i>thablong, kongka</i> ), fruits ( <i>thilik, thaiselem</i> ), beans, masur and moong.	(C)		(C)
Tripura	South Tripura	Tropical Moist Deciduous	Noatia	UU	Recently adopted plough cultivation.	Singh 1996	Rice, market bought brinjals and potatoes, wild <i>samsata, balangtha and thaisua</i> , bamboo shoots, moong and masur.	(C)		(C)
Tripura	South Tripura	Tropical Moist Deciduous	Uchai	UU	Shifting and, recently, some plough cultivation	Singh 1996	Rice.	(C)		
West Bengal	Puruliya	Subtropical broadleaved hill forest	Santal	AA	Slash and burn, dry, wet cultivation and plough cultivation.	Bhowmick 2004, Sinha 1985	Millet, maize, lentils and rice, fruits, leaves, roots, tubers	(C) (G)	(C) (SC)	(C)

West Bengal	Darjeeling	Subtropical broadleaved hill forest	Bhutia	UU	Traditional occupation, now cultivate millet	Singh 1994a				
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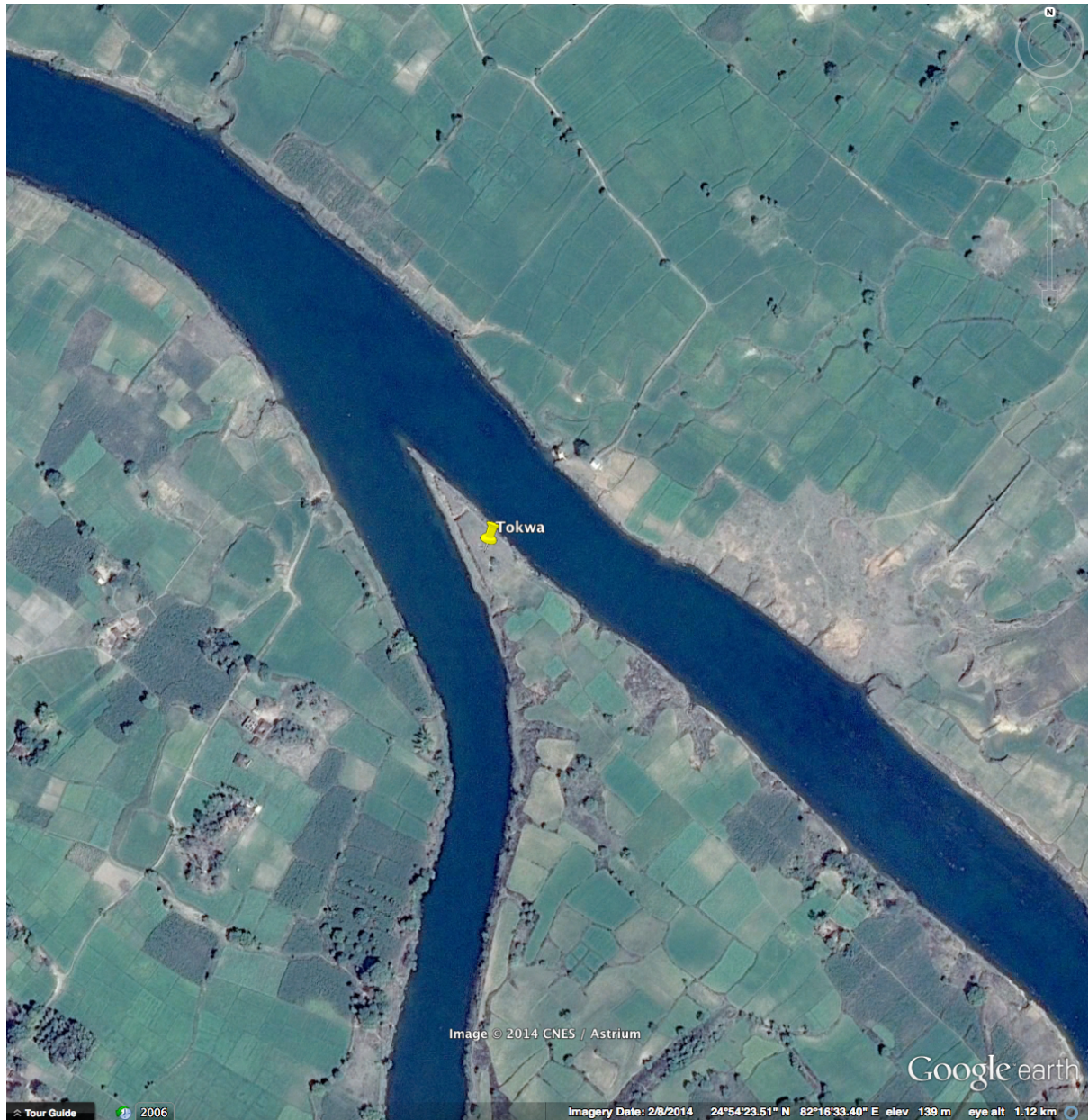
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Appendix II: Site locations, plans and section drawings.

Tokwa, Uttar Pradesh

24° 54' 20" N, 82° 16' 45" E



**Figure A: The location and surrounds of Tokwa.**

**Figure B: Plan of the Late Neolithic layer from Trench H8, Tokwa. From Misra et al. (2000-2001)**

**Figure C: Plan of the Middle Neolithic layer from Trench H8, Tokwa. From Misra et al. (2000-2001)**

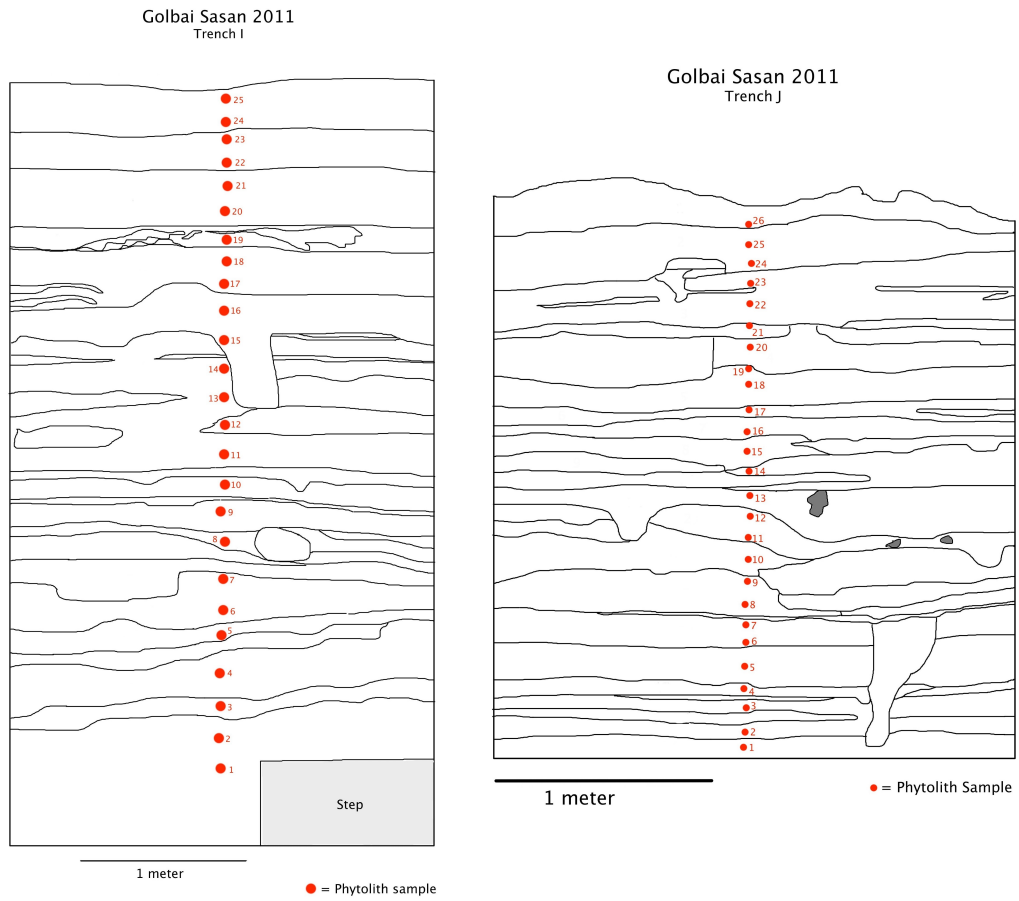
**Figure D: Section drawing of trench H8, Tokwa. From Misra et al. (2000-2001)**

Golbai Sasan, Odisha  
20° 1' 45" N, 85° 33' 22" E

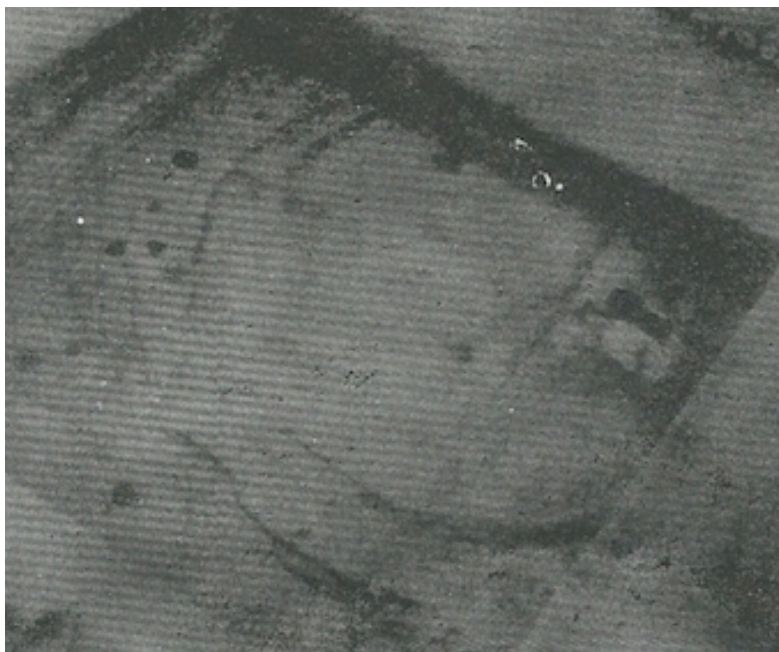


**Figure E: The location and surrounds of Golbai Sasan.**

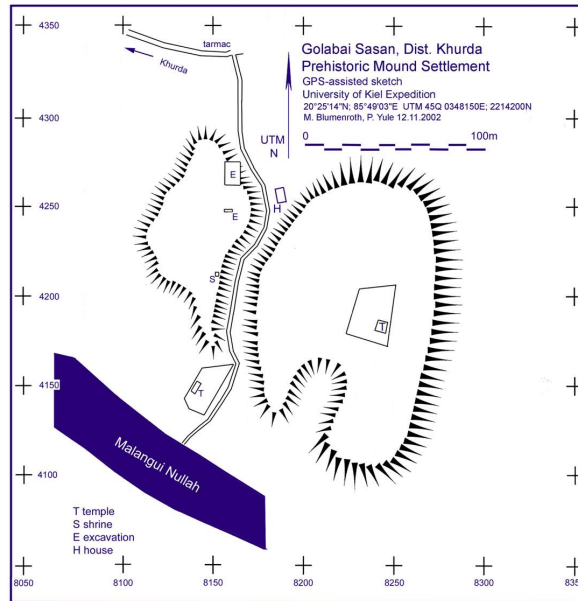




**Figure F: Section plans of trenches I and J.**



**Figure G: Chalcolithic house plan, from Sinha (2000).**

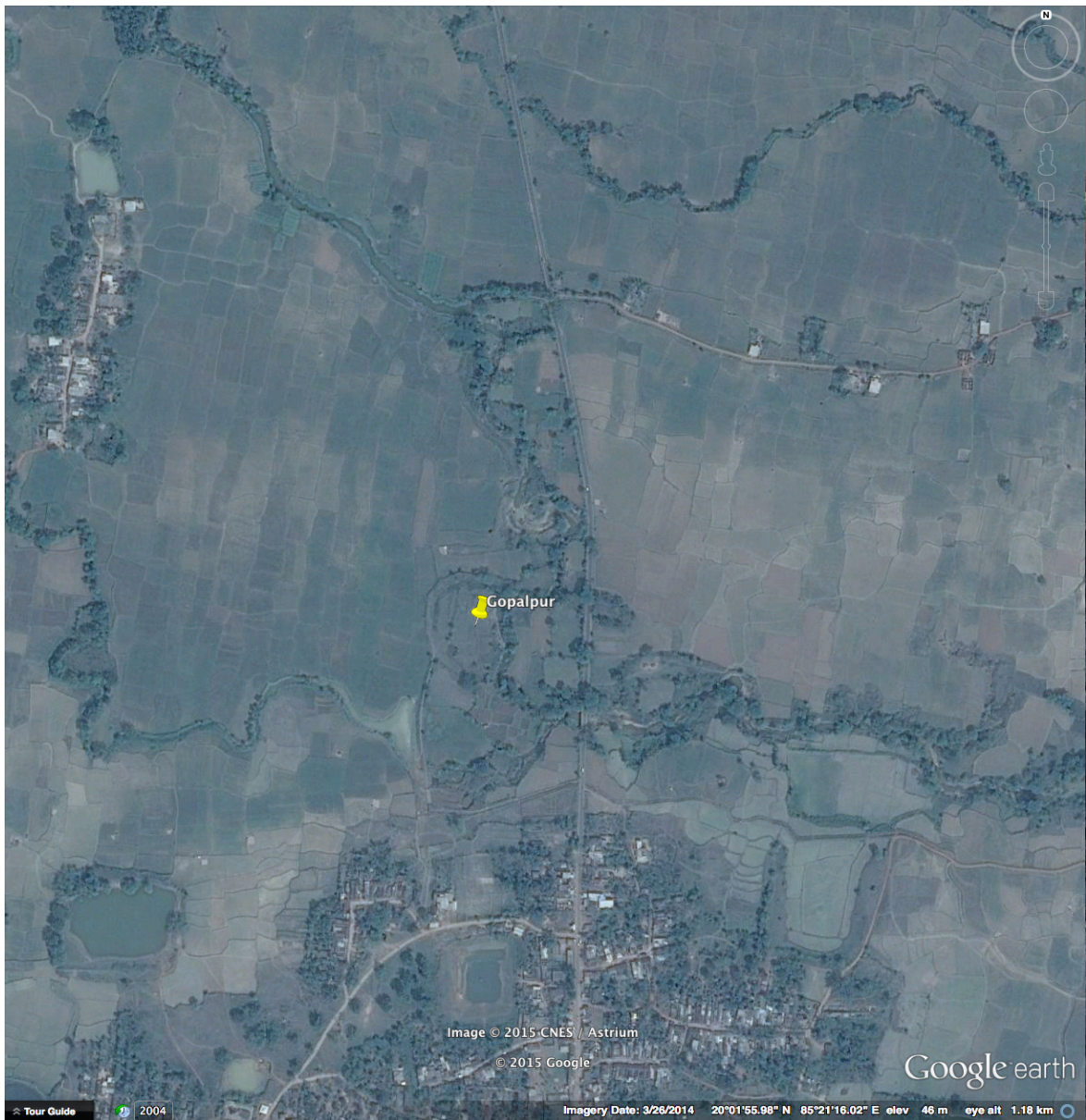


**Figure H: The settlement mound at Golbai Sasan. Yule (2003)**



**Figure I: Trenches C, D, E and F mid way through and in the final stages of excavation.**

Gopalpur, Odisha  
20° 1' 58" N, 85° 21' 15" E



**Figure J: Location and surrounds of Gopalpur.**



**Figure K: The eroded east facing section of the settlement mound at Gopalpur.**



**Figure L: Photo of the section excavated at Gopalpur '03 by Harvey (2006).**

Kodumanal, Tamil Nadu  
11° 6' 32" N, 77° 30' 38" E



**Figure M: Location and surrounds of Kodumanal**

Perur, Tamil Nadu

10° 58' 46.65" N, 76° 55' 1.5" E



**Figure N: Location and surrounds of trenches 1-5 excavated at Perur.**

**Figure O: East facing section of PRR-1 (Shetty 2003).**

**Figure P: North facing section of PRR-2 (Shetty 2003). Note: phytolith samples come from levels 3, 4 and 5.**

**Figure Q: South facing section of PRR-3 (Shetty 2003).**

**Figure R: West facing section of PRR-5 (Shetty 2003).**



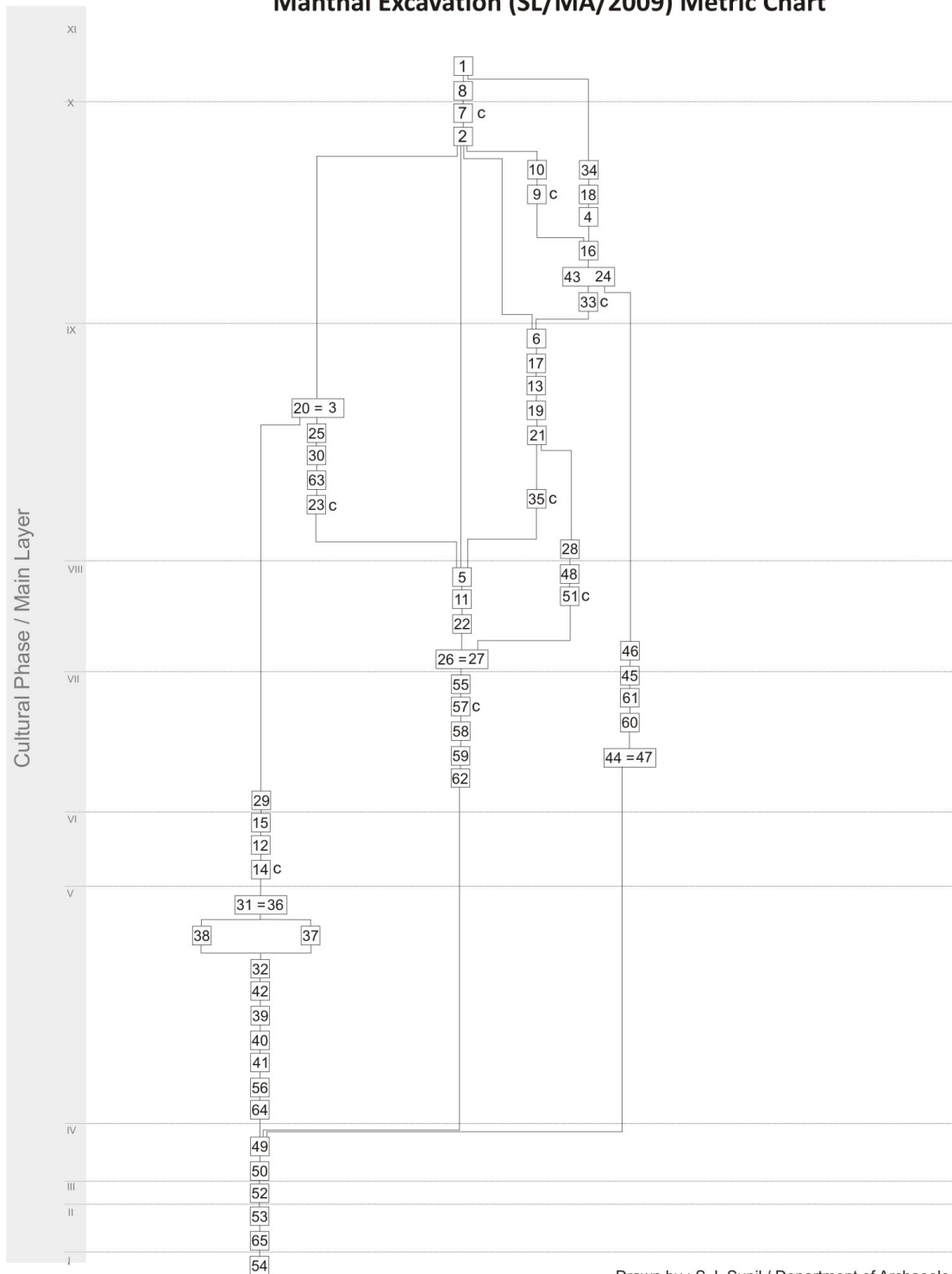
Mantai, Mannar, Sri Lanka  
8° 57' 22" N, 79° 57' 37" E



**Figure S: Location and surrounds of Mantai.**

**Figure T: Contour survey of Mantai, from Carswell et al. (2013).**

### Manthai Excavation (SL/MA/2009) Metric Chart



Drawn by : S.J. Sunil / Department of Archaeology  
 Digitized by : Jayampath Senanayaka / PGIAR

Figure U: Context and phase diagram for Mantai.

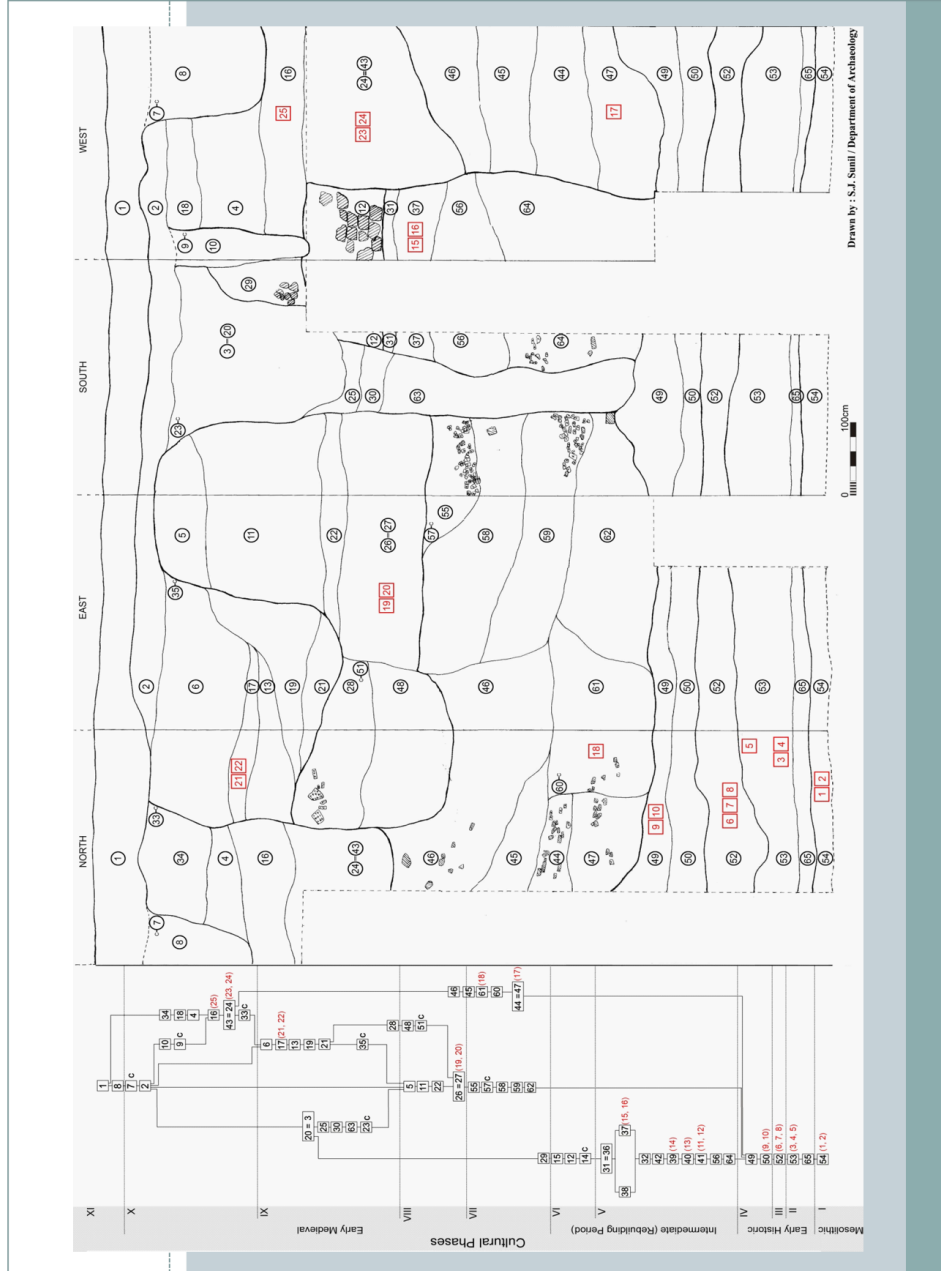
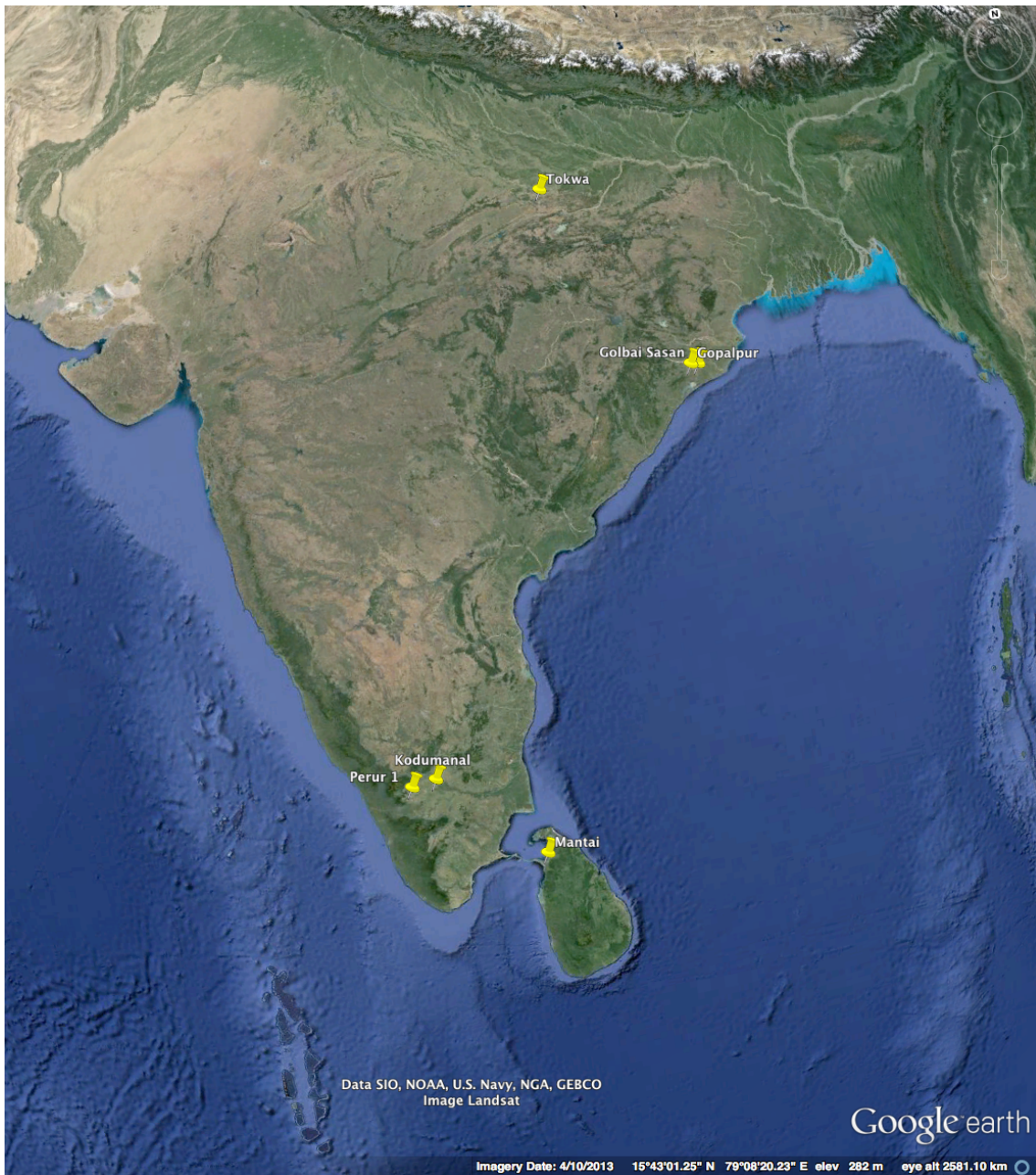


Figure V: Section plan of the Mantai 2009 excavations, provided by Wijerathne Bohingamuwa.



**Figure W: The location of all the sites within the South Asian subcontinent.**

## Appendix III: Modern rice field weed data

Site No.	GPS NW corner	Elevation	Field area (approximate)	Soil type	Cultivation type	Planting date/approximate harvest date	Rice variety
I1	N17°45'23.3 E73°24'50.3	40 m	6 m × 10 m	Red, iron rich, sandy	Lowland rainfed, bunds	Nearly mature	Subspecies <i>indica</i>
I2	N18°20'44.1 E73°32'01.8'	655 m	20 m × 8 m (Curved)	Red tropical soil, somewhat lateritic	Rainfed upland, transplanted	About to flower/flowering	<i>Tropical japonica/indica</i> hybrid (?), slight awn
I3	N18°20'15.5 E73°27'16.5'	693 m	30 m × 10 m	Colluvial from lateritic soils brown	Rainfed upland, broadcast, along small river	About to flower/flowering	Uncertain: <i>indica/japonica</i> ?
I4	N20°48'04.1' E86°09'15.4'	18 m	20 m × 30 m	Alluvial plain	Lowland, rainfed	Harvesting now (03/10/10)	Subspecies <i>indica</i>
I5	N22°1'35.9 E86°40'38.1	59 m	10 m × 40 m	Red acidic sandy soil	Uncultivated, seasonally flooded during monsoon area standing water in puddles	Some shattering, flowering & green immature spikelets	Annual wild rice ( <i>O. nivara</i> )
I6	N22°1'40.2 E86°40'31.8	59 m	40 m × 40 m	Red acidic sandy soil	Lowland, rainfed	Some in flower	Subspecies <i>indica</i>
I7	N22°10'49.0 E86°28'15.1'	333 m	20–30 m × 70 m	Upland (mountains N. Orissa)	Decrue: Shallow (no standing water) to deep water (~1 m) rice, sown when tank is low, around edge of stream fed pond/tank.	Planted June (1st wk) Harvest end of Nov	Subspecies <i>indica</i> (?). Cultivated by Munda tribal population.
I8	N22°10'44.2 E86°28'13.0'	335 m	20 m × 50 m	Upland (mountains N. Orissa)	Decrue: shown in stream, bed with standing water; shallow (~5 cm) and variable water depth at time of collection.	Planted June (1st wk) Harvest end of Nov	Subspecies <i>indica</i> (?). Cultivated by Munda tribal population.
I10	N21°46'53.7 E86°39'17.5'	55 m	30 m × 10 m	Clayey, over red sandy colluvium and alluvium	Pond fed by stream and irrigation overflow	Most flowering, some green	Perennial wild rice ( <i>O. rufipogon</i> )

**Table A: Location and details of the modern rice fields samples in India. From Weisskopf et al. (2013)**

Characterisation of rice stands	Dry		Dry		Dry		Dry		Wet		Wet		Wet	
	Cult.	Wild	Cult.	Cult.	Cult.	Cult.	Cult.	Cult.	Cult.	Cult.	Wild	Wild	Wild	Wild
Field number	I6	I5	I1	I2	I3	I7 west	I4	I8	I12	I7 east	I10	I9	I13	I11
Dicotyledons	A [29]	B [9]	A [17]	A [14]	A [16]	A [21]	A [16]	A [19]	A [6]	A [4]	B [6]	B [5]	A [6]	D [3]
Panicoids	B [7]	C [6]	B [2]	B [8]	C [3]	B [4]	C [2]	D [3]	B [3]	B [3]	C [2]	D [2]	0	B [3]
Chloridoideis	E [2]	D [2]	0	F [1]	D [2]	E [1]	F [1]	F [2]	0	0	0	0	0	F [1]
Pooids	0	G [1]	0	0	0	0	0	G [2]	0	0	0	E [1]	0	0
Cyperaceae	D [3]	A [5]	F [1]	C [2]	F [2]	C [4]	E [4]	C [3]	C [3]	0	A [3]	A [5]	C [1]	A [5]
Commelinaceae	F [2]	E [1]	C [4]	E [1]	E [2]	0	B [2]	E [3]	0	D [1]	E [1]	F [1]	0	E [1]
Other Monocotyledons	C [2]	G [2]	0	D [1]	B [2]	E [1]	D [1]	B [3]	0	C [1]	D [1]	D [2]	B [1]	D [2]
Total weed taxa	45	26	28	27	31	31	26	35	12	9	15	16	9	15

**Table B: Summary of the diversity and dominance of weed taxa identified during rice field surveys. A = most frequent, G = least frequent, 0 = not recorded. Numbers of species per category is in brackets and the total number of taxa recorded per field is shown at the bottom of the table. From Weisskopf et al. (2013).**

Field I8	Survey points					
	1	2	3	4	5	6
Description		5-10 cm water		1-2 cm water	c.5cm water	
<i>O. rufipogon</i> . Flowering	xx					
<i>O. minuta</i> type. In flower. Perennial	xxx					
<i>Paspalum</i> sp.	xxx	xx				xx
Shrubby crucifery, yellow flowers	xx			xx	xx	xx
Little <i>Panicum</i> type 2	xx					
<i>Commelina</i> type	xx			x		xx
<i>Nymphaea</i> sp.- deeper water	xxx					
Commelinaceae, not <i>Commelina</i> sp.	xx			xx	x	xx
Monocot, white flower, floating aquatic	x					
Decussately opposite, serrated leaved scrof	x					
<i>Cyperus</i> sp.	xx	xx		xxx	xx	
Alternate, ovate leaved ground cover	x					
Alternate leaved ovate dicot	x					
<i>Scirpus</i> sp.	xx	xxx		x		xx
<i>Phyllanthus</i> sp.		xx				xx
Red veined <i>Cyperus</i>		xx		xx		xxx
Commelinaceae/liliaceae with grass like leaves		xx				
<i>Eriocaulon</i> sp.		xxx	xxx	xxx	xxx	xxx
<i>Panicum</i> type 1		x		xxx	xxx	xxx
tall <i>Eragrostis</i> sp.		xx				
Bristleless grass		xx				
<i>Mimosa</i> sp.		xx				
Amarilidaceae type/ <i>Eriocaulon</i> sp.		xx	xx		xxx	xx
Decussately opposite, red stalked.		xx	xx	xx	xx	x
Alternate leaved reniform, erect		xx	x	xx	xx	xx
Thin strap like leaves, decussately opposite, probs crucifery			xx			x
Ovate, pointy leaves. Small erect				xx		
Serrate leaved <i>Scrofulaceae</i>				x	x	xx
Alternate, ovate dicot from before					x	
<i>Phyllanthus</i> sp? <i>Mimosa</i> sp.?					xx	xx
Spiked grass, no bristles						xx
Opposite, purple tinged leaves, axillary fruits						xx
<i>Eragrostis</i> sp.				x		xx
Op. leaves, squarish stems, purple flowers						x
'Tilliaceae'						x
Urticaceae type. Decussately op. Hairy. Round red stalk, serrated leaves						x
Trifoliolate, somewhat erect						x

**Table C: An example of the field data collected on survey. xxx = 4+ plants per meter square, xx = 2-4 plants, x = 1 plant. Plants were pressed and are in the process of being identified. Over 600 specimens have been collected.**

Appendix IV: Phytolith terms used in this study and their ICPN equivalent.

	<b>ICPN nomenclature</b>	<b>Notes</b>
<b>Single cells</b>		
Long smooth	Elongate psilate - epidermal long cell	
Long sinuate	Elongate sinuate - epidermal long cell	
Long rods	Elongate psilate/Cylindric smooth - epidermal long cell	Long and narrow - from the Cyperaceae
Long dentritic	Elongate dentritic - epidermal long cell	Grass inflorescence
Stomata		
Papillae	Papillae cell	Glumes
Hair	Hair cell	
Bulliform	Parallepipedal bulliform	Grass leaf
Cuneiform bulliform		Grass leaf
<i>Oryza</i> type cuneiform bulliform		<i>Oryza</i> sp. leaf
Crenate		
Bilobe		Found in many Panicoid grasses
<i>Setaria</i> type bilobe		
<i>Oryza</i> type bilobe	Bilobate - concave apexes - epidermal short cell	
Cross	Quatra-lobate - epidermal short cell	Found in some Panicoid grasses
Rondels		
<i>Stipa</i> type rondel		
Saddles		From the Chloridoid grasses
Collapsed saddle	Epidermal short cell	From the Bambusoideae
Cones	Conical	Cyperaceae inflorescence
Sedge achene		
Double-peaked glume cell	Bi-echinate - epidermal cell	Specific to <i>Oryza</i> sp. husk
Smooth spheroid	Globular psilate	
Echinate spheroid	Globular echinate	From the Areaceae
Verrucate		
Crescent		
Long echinate	Elongate echinate	Dicots



Appendix IV: Phytolith terms used in this study and their ICPN equivalent.

	<b>ICPN nomenclature</b>	<b>Notes</b>
Long irregular	Elongate irregular	Dicots
Trachied		
Two-tiered		
Block	Square rectangular psilate	
Platey		
Sheet	Irregular shape psilate	
Single polyhedron	Polyhedron shape psilate	Dicot leaves
Scalloped	Irregular shape	Dicots, some specific to Cucurbitaceae
Single jigsaw	Multi-lobate irregular pattern	
<b>Multi-cell panels</b>		
Hair base		Anatomical term
Leaf/culm indeterminate		
Leaf/culm long cells	Elongate psilate - epidermal long cells	
Leaf/culm bilobe	Bilobate - epidermal short cells	
Leaf/culm saddle	Saddle - epidermal short cells	
Leaf/culm cross	Quadra-lobate - epidermal short cell	
Leaf/culm cf. <i>Panicum</i>		
Leaf/culm <i>Oryza</i>		
Leaf/culm <i>Phragmites</i>		
Leaf/culm reed		cf <i>Phragmites</i> but with fewer ID criteria
Leaf/culm square cell		
Leaf/culm stomata		
Husk indeterminate		
<i>Setaria</i> husk		
<i>Panicum</i> husk		
Millet type 1 husk		Similar to <i>Setaria</i> sp. but without all ID criteria
Millet type 2 husk		Similar to <i>Panicum</i> sp. but without all ID criteria
<i>Oryza</i> husk	Bi-echinate - epidermal cells	Double peaked glume hairs - specific to <i>Oryza</i> sp.

Appendix IV: Phytolith terms used in this study and their ICPN equivalent.

	<b>ICPN nomenclature</b>	<b>Notes</b>
Cyperaceae		
Mesophyll		
Indeterminate multicell		
Indeterminate phytolith		

Appendix V: Macrobotanic remains from Manika Patana, Odisha.

Sample	19	20	22	24	27	28	29	30	31	33	34	38
Species												
Charcoal fragments >4mm (g)	0.13	0.58	0.78	0.18	0.16	0.03	0.09	0.14	0.19	0.17	0.04	0.12
Charcoal fragments >4mm (#)	4	11	16	8	5	1	3	2	3	6	1	4
Cereal fragments	1	4				2				1	1	
<i>Oryza</i> sp. grain fragments	1				1		1					
Culm node 4-2mm										1		
cf. <i>Brachiaria</i> sp.										1		
cf. <i>Commelina</i> sp.				1								
<i>Cyperus</i> sp.				1								
Poaceae >0.5mm				1								
Seed indet.			4	2					3			
Indet. tuber parenchyma fragments						2						

Appendix VI: Macrobotanic data for all sites examined.

Sample	A3-12	A3-16	A4-9	A4-15	A5-9	A5-12	A5-15	B1-9	B2-10	B2-15	B4-9	B5-9	B4-13	B4 C4-12	B5-9	BC1 Pit SB-6	BC1 Pit SB-4	BC4-12	C1-15	C3-11	C4-4	E1-9
Species																						
<i>Oryza sp.</i>	8		4	14	2	4	4		1					1			6	13	23		8	1
<i>Hordeum sp.</i>				1	1													2	1	3		1
<i>Hordeum vulgare</i>									1													
<i>Triticum</i>												1			2			1				
<i>Vigna sp.</i>	3		3	8	1	10		9	29			1			6	4	17			4		2
<i>Vigna cf. radiata</i>			3	1																		
<i>Pisum sativum</i>																				1		
<i>Pisum/ Lathyrus</i>																				4		
<i>Lens sp.</i>	1						1	2										1			1	
<i>Lens culinaris</i>					1																	1
<i>Brachiaria ramosa</i>				1					2													
Small millet indet			1																			
Fruit stone fragments		1									1	5	54	40								
Weed seed indet.					1																	
<i>Bromus sp.</i>									2													
<i>Chenopodium sp.</i>																		1				
cf. <i>Lolium</i>																		1				

Table A: Raw data for macrobotanic remains from Tokwa.

Length	Height	Width	L/W
4.5	1.8	2.4	1.88
4.5	1.7	2.5	1.80
3.7	1.5	2.1	1.76
4.3	1.8	2.1	2.05
4.4	2.0	2.4	1.83
4.5	1.4	2.4	1.88
4.5	1.6	2.4	1.88
3.8	1.3	2.0	1.90
4.3	1.7	2.2	1.95
4.5	2.7	2.3	1.96
4.3	1.6	2.0	2.15
3.9	1.2	1.8	2.17
4.6	1.4	2.1	2.19
4.5	1.5	1.8	2.50
4.4	1.4	1.9	2.32
4.4	1.5	1.8	2.44
4.5	1.3	1.7	2.65

Table B: Length, height and width of measurable rice grains from Tokwa (mm).

P value	Number of rice grains
1	
2	18
3	38
4	15
5	18
6	

Table C: Preservation values for rice grains identified at Tokwa.

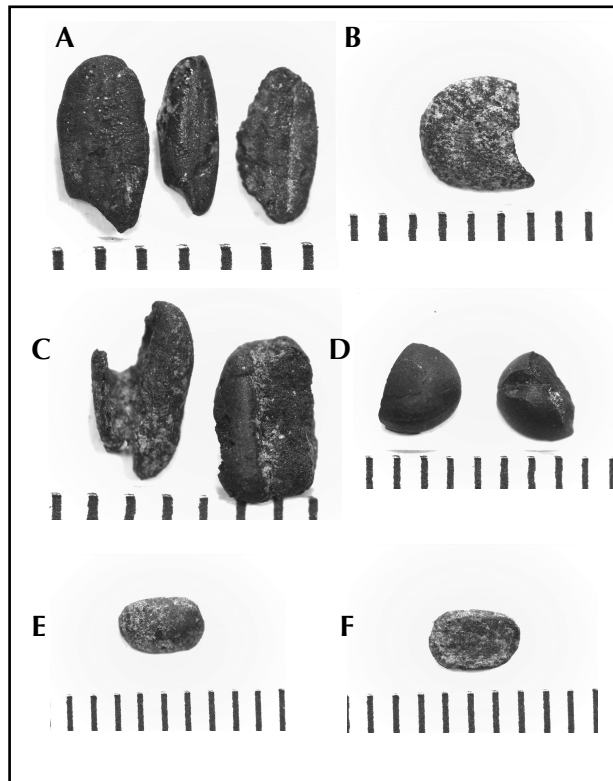


Figure B: Macro remains from Tokwa. A) *Oryza sativa* ssp. B) *Lens culinaris*. C) *Triticum* sp. D) *Pisum* sp. E) *Vigna* sp. F) *Vigna* cf. *radiata*. Scales in mm.

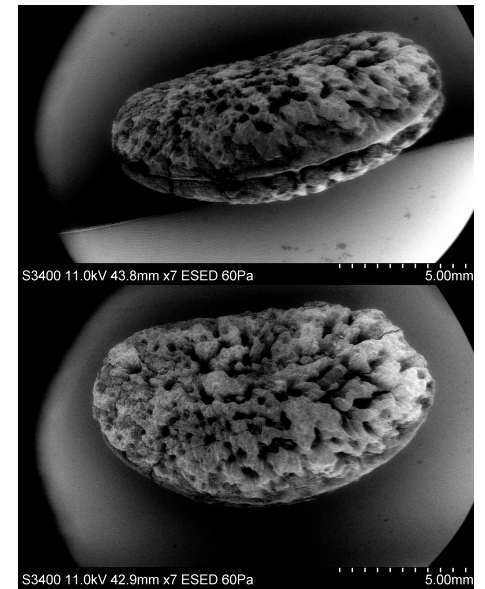


Figure A: Unidentified fruit stone from Tokwa.

Sample	D1	E4	F2	F3	F4	F8	I2	I5	I7	I10	I11	I12	I13	I14	I15	I16	I17	I18	I19	I20
Soil volume (l)			20.5	16	34.5	19	9	7		8	17.5	9	18	8	8	6	25.5	33.5	43	32
Species																				
Charcoal fragments			11	1	3			1		3		1	10			2	30	4		3
Charcoal weight (g)			0.013	0.001	0.001			0.001		0.005		0.001	0.01			0.001	0.042	0.01		0.001
<i>Oryza</i> sp.	3	13	81		1	4					5					2	30	1		
cf <i>Oryza</i> sp.			11	4	16								7				4	4		
Cereal indet.			61	6	5	8							26			4	53			
<i>Oryza</i> sp. spikelet bases domestic type				3	8			2		2		3								
<i>Oryza</i> sp. spikelet bases immature					1															
<i>Oryza</i> sp. spikelet bases wild type					4															
<i>Oryza</i> sp. spikelet bases indeterminate					11							16								
Culm node. >0.5mm																			1	1
Rachis indet. >0.25mm																				
<i>Panicum</i> sp.																				
<i>Panicum</i> cf. <i>miliaceum</i>								1												
cf. <i>Panicum</i> sp.											1									
<i>Paspalum</i> sp.																				
<i>Setaria</i> sp.				1				1					2							
<i>Setaria</i> cf. <i>verticillata</i>								1												
<i>Echinochloa</i> sp.								2			2									
Millet indet.								5					1							
<i>Vigna</i> sp.								1												
cf. <i>Vigna</i> sp.													2							
Pulse indet.								3												

**Table D: Raw data for macrobotanic remains from Golbai Sasan.**

Sample	J4	J5	J6	J8	J9	J10	J11	J12	J13	J16	J17
Soil volume (l)	17	9	10	10.5	8.5	7.5	10	12	10.5	9	9.5
Species											
Charcoal fragments		1	1				4				1
Charcoal weight (g)		0.001	0.001				0.1				0.001
<i>Oryza</i> sp.		31	10		4		23	1		4	6
cf <i>Oryza</i> sp.		4	14						1		7
Cereal indet.		28	20			2	27			16	16
<i>Oryza</i> sp. spikelet bases domestic type	3				2			1		1	
<i>Oryza</i> sp. spikelet bases immature											
<i>Oryza</i> sp. spikelet bases wild type											
<i>Oryza</i> sp. spikelet bases indeterminate											
Culm node. >0.5mm											
Rachis indet. >0.25mm						1					
<i>Panicum</i> sp.										9	1
<i>Panicum</i> cf. <i>miliaceum</i>											
cf. <i>Panicum</i> sp.											
<i>Paspalum</i> sp.											4
<i>Setaria</i> sp.										7	19
<i>Setaria</i> cf. <i>verticillata</i>											
<i>Echinochloa</i> sp.										3	
Millet indet.										7	8
<i>Vigna</i> sp.			2								
cf. <i>Vigna</i> sp.											
Pulse indet.											

**Table D continued: Raw data for macrobotanic remains from Golbai Sasan.**

Sample	D1	E4	F2	F3	F4	F8	I2	I5	I7	I10	I11	I12	I13	I14	I15	I16	I17	I18	I19	I20	J4	J5	J6	J8	J9	J10	J11	J12	J13	J16	J17	
Soil volume (l)			20.5	16	34.5	19	9	7		8	17.5	9	18	8	8	6	25.5	33.5	43	32	17	9	10	10.5	8.5	7.5	10	12	10.5	9	9.5	
Species																																
cf. <i>Asteraceae</i>																		1														
cf. <i>Araliaceae</i>																		1													1	
Indet. Large teardrop shape																					1											
Cyperaceae										1							1										1		2			
cf. <i>Ipomea</i> sp.												1																				
Lamiaceae																		1														
cf. Liliaceae																		1														
Poaceae																														1		
Portulacaceae																						1										
cf. <i>Rumex</i> sp.										1																						
cf. <i>Schoenoplectus</i> sp.													1																			
<i>Scheonoplectus</i> sp.																							2									
cf. <i>Scirpus</i> sp.													2																			
<i>Sida</i> sp.																											1					
Flower pedicle																						1										
cf. Peel fragments					2																											7
cf. nut shell fragments												5						1														
Indeterminates								5		5									3		7							2				

Table D continued: Raw data for macrobotanic remains from Golbai Sasan.

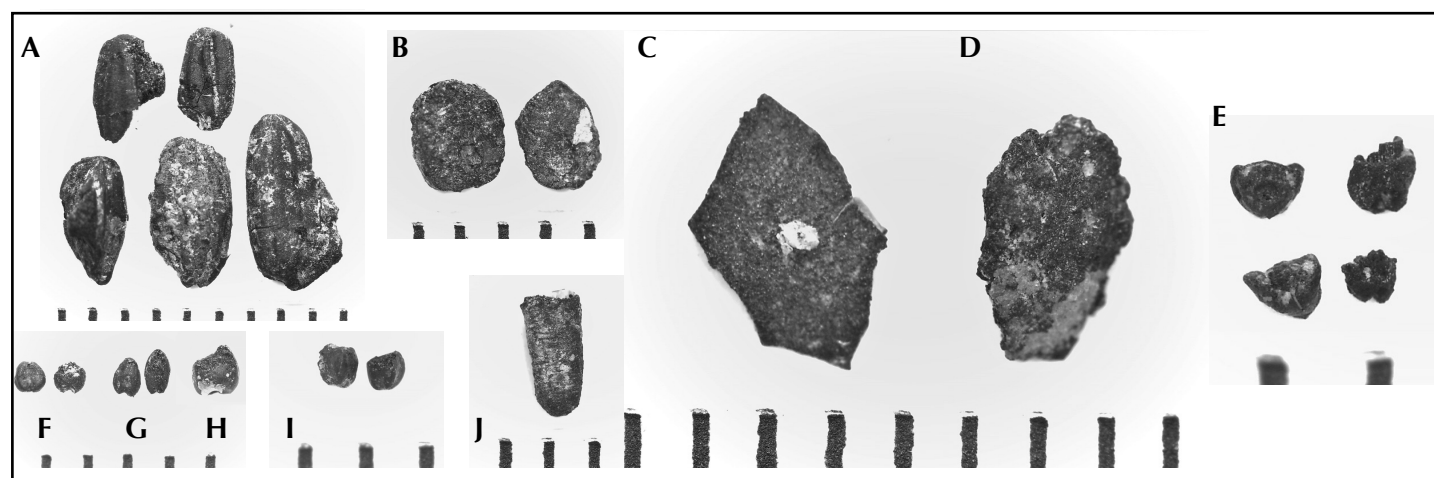


Length	Height	Width	L/W
3.1	1.3	1.6	1.94
4.6	1.9	2.5	1.84
4.6	1.7	2.4	1.92
5.4	1.5	2.1	2.57
4.5	1.6	2.5	1.80
3.5	1	1.7	2.06
5.1	1.5	2.6	1.96
6	1.9	2.9	2.07
5.1	2	1.4	3.64

**Table E: Length, height and width of measurable rice grains from Golbai Sasan (mm).**

P value	Number of rice grains
1	
2	1
3	9
4	139
5	86
6	5

**Table F: Preservation values for rice grains identified at Golbai Sasan.**



**Figure C: Macro remains from Golbai Sasan A) *Oryza sativa* ssp. B) *Vigna* sp. C) cf. shell fragment D) cf. peel fragments E) *Oryza sativa* ssp. spikelet bases F) *Echinochloa* sp. G) *Setaria* sp. H) *Panicum* cf. *miliaceum* I) Cyperaceae J) cf. Asteraceae. Scales in mm.**

Context	GPR-03A-1	GPR-03A-2	GPR-03A-3	GPR-03A-4	GPR-03A-5	GPR-03A-6	GPR-03A-7	GPR-03A-8	GPR-03A-9	GPR-03A-10	GPR-03A-11	GPR-03A-12	GPR-03A-13	GPR-03A-15	GPR-04-7a	GPR-04-7b	GPR-04-8	GPR-04-11	GPR-04-12	GPR-04-13	GPR-04-14	GPR-04-15	GPR-04-16	GPR-04-18	
Soil volume (l)	20	20	20	20	20	20	20	20	20	20	20	20	20	20											
Species																									
<i>Oryza sativa</i> cf. <i>indica</i>	3	1	5	5	4	30	17	28	4	6	19	5	10		2		7	21	36	43	78	4			
cf <i>Oryza</i> sp.																			4		7	2			
Cereal indet						1									9		42	10	29	119	94	5	3		
<i>Oryza</i> sp glumes			1								1		1												
<i>Oryza</i> sp. spikelet bases domestic type															1		1	1			1	20		1	25
<i>Oryza</i> sp. spikelet bases immature																									
<i>Oryza</i> sp. spikelet bases wild type																									
<i>Oryza</i> sp. spikelet bases indeterminate															1	1	1	2			4	73			
cf. <i>Setaria</i> sp.																									
<i>Setaria</i> sp.		1				1	3								2	1	2				1	8			
<i>Panicum sumatrense</i>				1																					
cf. <i>Panicum</i> sp.																									
<i>Panicum</i> sp.						11		1																	
<i>Paspalum</i> sp.						1																			
cf. <i>Echinochloa</i> sp.																						5	1		
<i>Echinochloa</i> sp.						1																1	10	1	
Small millet indet.						14		18		3	1			2	4		10	5			1	15		1	

**Table G: Raw data for macrobotanic remains from Gopalpur. GPR-03 data from Harvey (2006) included for completeness.**

Context	GPR-03A-1	GPR-03A-2	GPR-03A-3	GPR-03A-4	GPR-03A-5	GPR-03A-6	GPR-03A-7	GPR-03A-8	GPR-03A-9	GPR-03A-10	GPR-03A-11	GPR-03A-12	GPR-03A-13	GPR-03A-15	GPR-04-7a	GPR-04-7b	GPR-04-8	GPR-04-11	GPR-04-12	GPR-04-13	GPR-04-14	GPR-04-15	GPR-04-16	GPR-04-18
Soil volume (l)	20	20	20	20	20	20	20	20	20	20	20	20	20	20										
Species																								
<i>cf. Macrotyloma</i>																			2					
<i>M. uniflorum</i>		8	8			1	1																	
<i>M. uniflorum</i> frag		38	73			10	8	2	1											1				
Pulse fragment	35	101	166	3	3	62	22	14	6	3	5				3		1		12	5	2	2		
<i>cf. Andropogon</i> sp.								1																
<i>Brassica/Gallium</i> type															4	5		1	4		2	5	3	
<i>Celtis</i> sp.		1									1													
<i>Cenchrus</i> sp. type		1																						
Cyperaceae type								1	2						1			1	2	7	1			
<i>cf. Cyperus</i>									3															
<i>Cyperus</i> sp.																			1	1				
<i>cf. Eragrostis</i> sp.					2																			
<i>Ischaemum rugosum</i>						1		1		1	6													
Large grass type 1		24	4	1														1						
Small grass		7						2																
Polygonaceae type						14	2	2			4	1	1											
Rubiaceae fruit fragment										3														
<i>cf. Citrus</i> peel fragments															5				4		71	9	10	1
Peel indet. fragments																		2	1		78	2		1
Funicular cap indet		3																						
Culm node																						1		
Charcoal fragments >4mm	xx	xxx	xx	xx	xx	xx	xx	xx	x	x	xx	xx	x	x	1	5			8	4	4			1
Indeterminates	9	33	45	6	9	76	27	52	7	5	9	6	6	4	18	2	70	5	12	8	17	15	23	

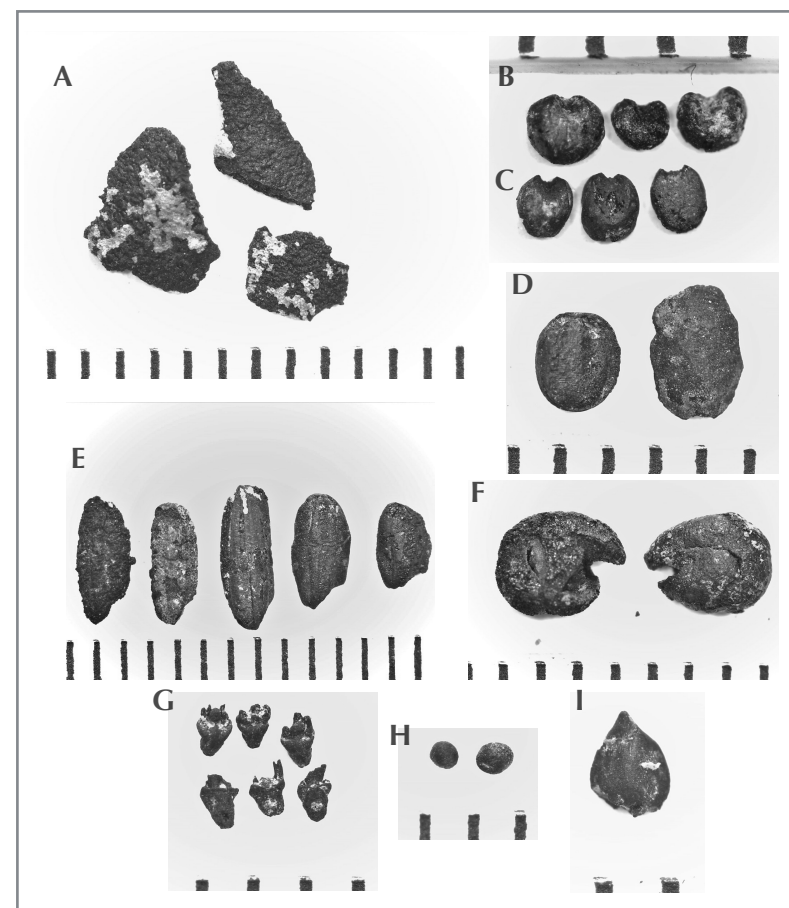
**Table G continued: Raw data for macrobotanic remains from Gopalpur. GPR-03 data from Harvey (2006) included for completeness.**

Length	Height	Width	L/W
4.3	1.8	2.5	1.72
4.4	1.5	2.5	1.76
4.4	1.4	2.5	1.76
4.4	1.7	2.5	1.76
4.3	1.8	2.4	1.79
4.4	2.0	2.4	1.83
4.5	1.6	2.4	1.88
3.8	1.3	2.0	1.90
4.3	1.7	2.2	1.95
4.5	2.7	2.3	1.96
4.3	1.6	2.0	2.15
3.9	1.2	1.8	2.17
4.8	1.4	2.2	2.18
3.8	0.9	1.7	2.24
4.5	1.4	2.0	2.25
4.9	1.3	2.1	2.33
5.0	1.4	2.1	2.38
4.5	1.4	1.8	2.50
4.5	2.8	1.8	2.50
4.5	2.7	1.8	2.50
3.9	1.0	1.5	2.60
4.0	1.0	1.5	2.67
4.0	1.1	1.5	2.67
5.6	1.4	2.0	2.80

P value	Number of rice grains
1	
2	16
3	32
4	61
5	79
6	3

**Table I: Preservation values for rice grains identified at Gopalpur.**

**Table H: Length, height and width of measurable rice grains from Gopalpur (mm).**



**Figure D: Macro remains from Gopalpur. A) *Citrus* sp. peel fragments B) *Echinochloa* sp. C) *Setaria* sp. D) *Vigna* sp. E) *Oryza sativa* cf. *indica* F) cf. *Macrotyloma* sp. G) *Oryza sativa* ssp. spikelet bases H) *Brassica*/*Gallium* type I) *Cyperus* sp. Scales in mm.**

Sample	62	61	59	58	55	53 L	53 U	52	52 L	50 M	50	49	49 L	49 M	48	47	46	45	44	43	41	40	39	37	32	31 = 36	28	26	25	24	22	21	20	19	17	16	13	11						
Soil volume (l)	10	20	20	10	20	20	10	20	20	10	10	20	20	20	20																													
Phase		7	7	7	7	2	2	3	3	4	4	4	4	4	8		8	8	7		10	5	5	5	5	5	5	9	8	9	10	8	9	9	9	9	9	10	9	8				
Species																																												
cf. <i>Oryza</i> sp.		1	31		1						1					8								176			6		9			34	3							5				
<i>Oryza</i> sp.	12	109	18	15	52	1		5		9	7	28	2	4	89	33	129	327	13	62	44	67	9	355	26	1	57	9	7	16	49	36	17	118	16	9	68	11						
cf. <i>Triticum</i> sp.		2	2		5										10	4	4	10		1				2		5	1	4			12	3	7	3					5	1				
<i>Triticum</i> sp.	1	3	1		1			1								1			1					3			2			2	1	5	2	1						2				
<i>Triticum</i> cf. <i>aestivum</i> / <i>durum</i>		2			1										2						1				1					3											2			
<i>Triticum</i> <i>aestivum</i> / <i>durum</i>		4			6										12	3		4		3				1			1									4		2	1	2	2			
Cereal grain indet.	10	21	88	7	37		1	16				3		2	22		75	71		71	8	33		42	3		23	11	3	2	61	54	28	156	1	10	105	1						
<i>Oryza</i> sp. <i>spikelet bases</i>		48			72		3	68	5		247						255	298	87	141	12		77	39	7	71			139	331	203	85	111							274				
<i>Triticum</i> sp. <i>rachis</i>																															1													
cf. <i>Vigna</i> sp.					2					4										2																								
<i>Vigna</i> sp.								3		2		1					1	2		1				3														2						
<i>Vigna</i> <i>aconitifolia</i>																					3																							
<i>Vigna</i> cf. <i>radiata</i>						1																																						
<i>Vigna</i> cf. <i>urad</i>																																												

Table J: Raw data for macrobotanic remains from Mantai.

Sample	62	61	59	58	55	53 L	53 U	52	52 L	50 M	50	49	49 L	49 M	48	47	46	45	44	43	41	40	39	37	32	31 = 36	28	26	25	24	22	21	20	19	17	16	13	11											
Soil volume (l)	10	20	20	10	20	20	10	20	20	10	10	20	20	20	20																																		
Phase		7	7	7	7	2	2	3	3	4	4	4	4	4	8		8	8	7		10	5	5	5	5	5	5	9	8	9	10	8	9	9	9	9	9	10	9	8									
Species																																																	
<i>Lens culinaris</i>		2						1													3																												
Legume indet.	1	1	2								2						1	8		5				1			3			1		1																	
<i>Setaria</i> sp.																											3													1									
<i>Setaria verticillata</i>								2																																									
cf. <i>Setaria/Bracharia</i>											1									1																													
<i>Setaria/Brachiaria</i>								2																																									
Small millet indet.											5						1										1										4					3							
<i>Piper</i> cf. <i>nigrum</i>					1					1														4								1									2								
<i>Piper nigrum</i>																		1		2																							1						
<i>Syzygium aromaticum</i>																																																	
<i>Vitis</i> sp.		1																																															
"Small acorn"																																																	
"Amaranthus" type																																																	
Amaranthaceae																																																	
Asteraceae																																																	
<i>Bulbostylis capillar</i>																																																	

Table J continued: Raw data for macrobotanic remains from Mantai.

Sample	62	61	59	58	55	53 L	53 U	52	52 L	50 M	50	49	49 L	49 M	48	47	46	45	44	43	41	40	39	37	32	31 = 36	28	26	25	24	22	21	20	19	17	16	13	11					
Soil volume (l)	10	20	20	10	20	20	10	20	20	10	10	20	20	20	20																												
Phase		7	7	7	7	2	2	3	3	4	4	4	4	4	8		8	8	7		10	5	5	5	5	5	5	9	8	9	10	8	9	9	9	9	10	9	8				
Species																																											
Chenopodioid eae																				1																			1				
<i>Chenopodium</i> sp.																		1		1																				1			
<i>Coix</i> sp.								1																																			
Cyperaceae					1													4					1		3		1				12			1						2			
<i>Cyperus</i> sp. rounded					2						4							2						1		2				3							2						
<i>Cyperus</i> sp. flat																																						1		3			
<i>Cyperus</i> <i>digitatus</i>																											1													1			
<i>Cyperus</i> "halpan" type																			1																								
<i>Cyperus</i> cf. <i>Iria</i>																				1																							
<i>Cyperus</i> cf. <i>pumilis</i>																				1																							
cf. <i>Eleocharis</i>																																											
<i>Echinochloa</i> sp.																																											
<i>Euphorbia</i> <i>esula</i>																																											
<i>Fimbristylus</i> <i>milliacea</i>																																											
<i>Galium</i> sp.			1																																								

Table J continued: Raw data for macrobotanic remains from Mantai.

Sample	62	61	59	58	55	53 L	53 U	52	52 L	50 M	50	49	49 L	49 M	48	47	46	45	44	43	41	40	39	37	32	31 = 36	28	26	25	24	22	21	20	19	17	16	13	11					
Soil volume (l)	10	20	20	10	20	20	10	20	20	10	10	20	20	20	20																												
Phase		7	7	7	7	2	2	3	3	4	4	4	4	4	8		8	8	7		10	5	5	5	5	5	5	9	8	9	10	8	9	9	9	9	10	9	8				
Species																																											
<i>Limnophila</i> sp.																																							1				
Poaceae/ Graminae					3			1										2	3											1	1									4			
Rubiaceae/ scrofulariaceae																		1																									
<i>Rubus</i> sp.																		1																							1		
Small grass																											1																
Scleria type																																											
<i>Stellaria</i> sp.											1							1																							6		
<i>Stellaria media</i>					1			1																																			
cf. <i>Solanum</i>								1										1																									
cf. Solinaceae					1																																						
cf. <i>Trianthema triquetra</i>											2																															1	
Rhizome <5mm																												1															
cf. Fruit peel					2																																						
<i>Canarium</i> sp.	1	1					1		1																																		
cf. <i>Canarium</i>						1																																					
Nut shell indet.	1	1	1	1	1	1	1	1	1	1	2	1	1	1							4																						
Indeterminates					10			1													4		7							2		1											

**Table J continued: Raw data for macrobotanic remains from Mantai.**

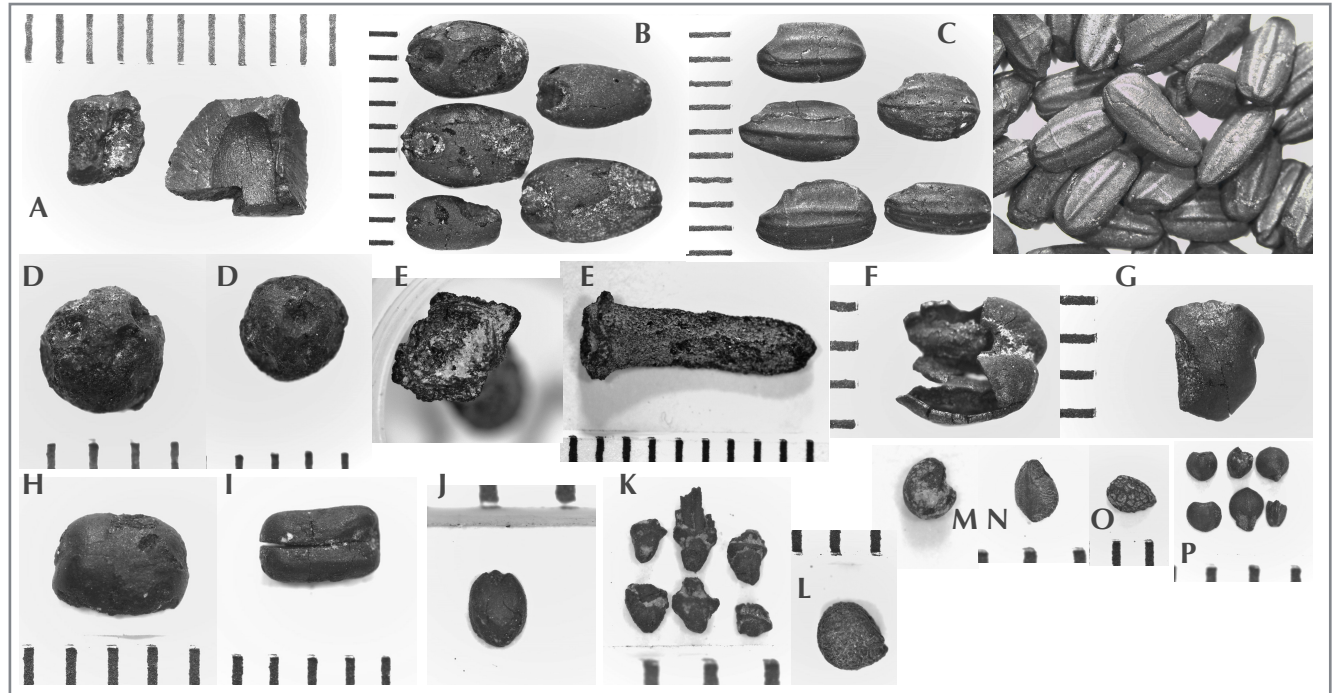


L	H	W	L/W	L	H	W	L/W	L	H	W	L/W	L	H	W	L/W	L	H	W	L/W
5.0	2.2	1.7	2.3	5.1	2.6	1.9	2.0	4.8	2.7	1.8	1.8	5.1	2.5	1.8	2.0	4.9	2.6	1.9	1.9
5.5	2.4	1.6	2.3	3.9	2.5	1.8	1.6	5.3	3.0	1.9	1.8	4.4	2.5	1.9	1.8	4.8	2.5	1.9	1.9
3.4	2.7	1.8	1.3	5.4	2.5	2.1	2.2	5.3	3.1	1.7	1.7	4.1	2.0	1.4	2.1	4.1	2.9	1.7	1.4
4.8	3.0	1.8	1.6	5.2	3.0	1.8	1.7	5.3	2.5	1.6	2.1	5.7	2.9	2.2	2.0	5.0	2.9	1.9	1.7
3.3	2.5	2.0	1.3	4.8	3.0	1.9	1.6	4.7	2.2	1.7	2.1	5.0	2.6	1.4	1.9	4.7	2.7	1.9	1.7
3.7	2.5	1.7	1.5	3.7	2.2	1.8	1.7	4.0	2.4	2.7	1.7	4.5	2.4	1.9	1.9	3.5	1.5	1.3	2.3
4.3	3.0	1.8	1.4	5.2	2.8	2.0	1.9	5.4	2.5	1.9	2.2	4.9	2.3	1.7	2.1	5.2	2.2	1.8	2.4
5.4	2.8	2.0	1.9	4.5	2.6	1.9	1.7	4.5	3.0	2.0	1.5	4.4	2.3	1.6	1.9	4.8	2.5	1.9	1.9
5.0	2.9	1.9	1.7	3.5	2.2	1.6	1.6	4.6	3.0	1.8	1.5	5.1	2.5	1.7	2.0	4.6	2.4	1.8	1.9
5.0	2.9	1.7	1.7	4.6	2.6	1.8	1.8	4.6	2.6	1.7	1.8	4.6	1.9	1.8	2.4	5.1	2.6	1.9	2.0
5.0	2.6	2.1	1.9	4.8	2.7	1.9	1.8	4.8	2.5	1.9	1.9	4.4	2.2	1.3	2.0	4.6	2.4	2.2	1.9
5.1	2.9	1.5	1.8	5.5	2.3	1.7	2.4	5.0	2.4	1.9	2.1	4.5	2.0	1.8	2.3	4.1	2.1	1.7	2.0
5.3	2.5	1.9	2.1	4.9	2.6	1.8	1.9	5.4	2.5	1.5	2.2	4.7	2.5	1.8	1.9	4.9	2.7	1.7	1.8
4.1	2.3	1.8	1.8	5.4	2.8	1.8	1.9	4.8	2.3	1.4	2.1	4.3	2.5	2.0	1.7	4.6	2.5	1.8	1.8
4.5	2.5	1.8	1.8	4.4	2.0	1.4	2.2	4.9	2.2	1.6	2.2	4.9	2.8	1.8	1.8	5.0	2.2	1.6	2.3
4.6	2.5	1.9	1.8	4.5	2.2	1.7	2.0	5.0	2.3	1.7	2.2	5.0	2.9	1.6	1.7	5.0	2.9	1.8	1.7
4.3	2.4	1.6	1.8	4.6	2.0	1.6	2.3	4.7	2.5	1.6	1.9	5.0	1.9	2.0	2.6	5.2	2.4	1.9	2.2
4.7	2.3	1.9	2.0	5.1	2.3	1.7	2.2	4.4	2.5	1.5	1.8	5.1	2.7	1.8	1.9	5.1	2.8	1.8	1.8
4.4	2.5	1.8	1.8	5.3	2.6	1.8	2.0	4.6	2.8	1.7	1.6	4.6	2.4	1.6	1.9	3.9	2.2	1.5	1.8
5.1	2.2	1.9	2.3	5.0	2.1	1.9	2.4	4.8	2.6	1.6	1.8	6.4	2.6	1.6	2.5	3.9	2.6	1.7	1.5
5.1	2.2	2.0	2.3	3.6	2.1	1.6	1.7	4.4	2.8	1.7	1.6	5.6	2.8	1.9	2.0	5.5	2.5	1.7	2.2
5.8	2.7	2.0	2.1	4.7	3.0	2.0	1.6	5.0	2.0	1.8	2.5	4.9	2.3	1.8	2.1	4.1	2.4	1.7	1.7
5.2	2.4	1.9	2.2	4.4	2.3	2.0	1.9	4.5	2.5	1.6	1.8	4.7	2.9	2.1	1.6	4.2	2.5	1.5	1.7
5.0	2.5	1.6	2.0	3.5	2.3	1.6	1.5	4.7	2.3	2.7	2.0	5.2	2.7	1.9	1.9	4.8	2.1	1.7	2.3
4.7	2.3	1.6	2.0	4.7	2.5	1.8	1.9												

**Table K: Length (L), height (H) and width (W) of measurable rice grains from Mantai (mm).**

P value	Number of rice grains
1	54
2	133
3	138
4	1355
5	422
6	16

**Table L: Preservation values for rice grains identified at Mantai.**



**Figure E: Macro remains from Mantai. Scale in mm. A) *Canarium* sp. nut shell B) *Triticum aestivum*/ *durum* C) *Oryza sativa* cf. *japonica* D) *Piper nigrum* E) *Syzygium aromaticum* F) *Vitis* sp. G) *Lens* sp. H) *Vigna* sp. I) *Vigna* cf. *radiata* J) *Setaria verticillata* K) *Oryza sativa* ssp. spikelet bases L) *Stellaria media* M) *Amaranthaceae* N) *Bulbostylis capillar* O) *Rubus* sp. P) *Cyperus* sp. rounded**

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-  
Kodumanal PRR-Perur Man-Mantai

	TKW-4	TKW-8	TKW-10	TKW-11	TKW-12	TKW-15	TKW-16
Long Smooth	43744.09	57484.73	85120.06	32508.05	583282.06	13854.35	4605.98
Long Sinuate	10398.18	18034.42	28595.02	12353.06	160242.32	5195.38	303.69
Long Rods	8246.84	52976.12	27265.02	13328.30	89735.70	8312.61	1164.15
Long Dendritic	8963.95	18034.42	17955.01	19179.75	275616.80	6234.46	2935.68
Echinate elongate	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stomata	358.56	1127.15	0.00	0.00	0.00	0.00	0.00
Hairs	1434.23	3381.45	1330.00	4551.13	12819.39	3117.23	354.31
Papillae	0.00	2254.30	0.00	975.24	0.00	0.00	0.00
Sedge Achene	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trichomes	1434.23	7890.06	4655.00	1950.48	6409.69	346.36	50.62
Prickle	1792.79	5635.76	1330.00	1300.32	6409.69	0.00	0.00
Ovals	358.56	2254.30	4655.00	1300.32	6409.69	0.00	0.00
Bottleshaped	0.00	0.00	0.00	0.00	0.00	346.36	0.00
Bulliform	22589.16	43958.91	24605.02	11377.82	282026.49	19742.44	1569.07
Cuneiform	5378.37	1127.15	9975.01	4226.05	64096.93	3117.23	759.23
Oryza Cuneiform	2509.91	0.00	665.00	325.08	0.00	346.36	253.08
Crenates	2151.35	1127.15	0.00	975.24	0.00	0.00	0.00
Bilobes	13625.21	25924.49	12635.01	17554.35	153832.63	12122.55	809.84
cf Setaria bilobe	1434.23	2254.30	3990.00	650.16	6409.69	692.72	50.62
cf Oryza bilobe	1434.23	4508.61	3325.00	4551.13	38458.16	1385.43	303.69
1/2 Bilobe	2151.35	4508.61	1995.00	1300.32	64096.93	692.72	0.00
Cross	6812.60	4508.61	1995.00	5526.37	57687.24	6927.17	455.54
Polylobes	717.12	2254.30	1330.00	325.08	12819.39	692.72	151.85
Rondels	6095.49	20288.73	3990.00	4226.05	70506.62	7273.53	607.38
cf Stipa Rondel	0.00	0.00	0.00	0.00	0.00	346.36	50.62
Saddles	3585.58	12398.67	7315.01	3900.97	89735.70	6927.17	404.92
Collapsed Saddle	358.56	0.00	1330.00	0.00	0.00	692.72	101.23
Flat Tower	717.12	2254.30	0.00	0.00	0.00	346.36	0.00
Horned Tower	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cones	1075.67	4508.61	0.00	650.16	12819.39	692.72	50.62
Echinate Spheroid	0.00	0.00	0.00	975.24	6409.69	692.72	101.23
Smooth Spheroid	358.56	4508.61	1995.00	1625.40	19229.08	0.00	0.00
Verrucate	0.00	1127.15	0.00	0.00	0.00	0.00	0.00
Crescent	717.12	0.00	0.00	0.00	0.00	0.00	0.00
Elongate	0.00	9017.21	0.00	1625.40	0.00	0.00	101.23
Tracheids	2151.35	7890.06	2660.00	4551.13	25638.77	1385.43	101.23
2 Tiered	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trapeziform	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blocks	358.56	12398.67	0.00	325.08	6409.69	346.36	0.00
Echinate Blocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Platey	0.00	3381.45	0.00	0.00	0.00	1039.08	50.62
Sheet	0.00	6762.91	665.00	1625.40	0.00	1731.79	151.85
Perforated Sheet	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Polyhedron	0.00	15780.12	0.00	325.08	6409.69	1385.43	50.62
Scalloped	1075.67	10144.36	665.00	0.00	0.00	2424.51	101.23
Single Jigsaw puzzle	0.00	0.00	0.00	325.08	0.00	1039.08	50.62

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-  
Kodumanal PRR-Perur Man-Mantai

	TKW-4	TKW-8	TKW-10	TKW-11	TKW-12	TKW-15	TKW-16
Leaf/culm indet	10756.74	526.00	10662.17	3867.38	0.00	21243.33	2699.47
Leaf/culm jigsaw	0.00	131.50	0.00	0.00	0.00	923.62	134.97
Leaf/culm rondels	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm bilobe	896.40	328.75	288.17	148.75	0.00	2309.06	269.95
Leaf/culm saddle	358.56	65.75	144.08	74.37	0.00	461.81	202.46
Leaf/culm cross	358.56	65.75	144.08	111.56	0.00	0.00	202.46
Leaf/culm oryza	179.28	131.50	144.08	148.75	0.00	923.62	0.00
Leaf/culm long cells	0.00	1906.76	0.00	446.24	0.00	6003.55	202.46
Leaf/culm stomata	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Smooth spheriod	358.56	0.00	0.00	74.37	0.00	0.00	67.49
Leaf/culm Echinete spheroid	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Phragmites sp.	0.00	0.00	0.00	0.00	0.00	461.81	0.00
Leaf/culm reed	179.28	0.00	0.00	0.00	0.00	923.62	67.49
Leaf/culm Panicum sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Square cells leaf/culm	0.00	263.00	144.08	371.86	0.00	461.81	0.00
Indet. husk	6454.05	2761.52	3313.92	892.47	0.00	13854.35	2024.61
cf. Setaria Husk	0.00	0.00	0.00	0.00	0.00	461.81	67.49
cf. Panicum Husk	0.00	65.75	0.00	0.00	0.00	0.00	0.00
Millet type 1 husk	358.56	0.00	288.17	0.00	0.00	461.81	67.49
Millet type 2 husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cf. Oryza Husk	0.00	0.00	432.25	520.61	0.00	0.00	269.95
cf. Triticum Husk	0.00	0.00	144.08	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	260.30	0.00	923.62	134.97
Polyhedron	358.56	0.00	0.00	74.37	0.00	0.00	0.00
Hair Base	0.00	197.25	0.00	0.00	0.00	0.00	0.00
Multi-Tiered forms	0.00	197.25	0.00	0.00	0.00	0.00	0.00
Mesophyll	537.84	65.75	288.17	0.00	0.00	461.81	67.49
Indet.dicot	0.00	263.00	1440.83	37.19	0.00	0.00	0.00
Indet .Multicell	179.28	526.00	1152.67	74.37	0.00	461.81	337.43
Indet.phytolith	0.00	0.00	0.00	0.00	0.00	1847.25	0.00
Diatoms	179.28	197.25	720.42	74.37	0.00	461.81	0.00
Sponge Spicules	0.00	131.50	144.08	37.19	0.00	0.00	0.00

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-  
Kodumanal PRR-Perur Man-Mantai

	GBSN-I2	GBSN-I3	GBSN-I4	GBSN-I5	GBSN-I6	GBSN-I8	GBSN-I17	GBSN-J1	GBSN-J5
Long Smooth	51895.54	10464.22	10230.37	40885.49	63618.76	96457.75	7908.19	46207.22	44335.17
Long Sinuate	15235.39	1077.20	3755.45	1657.52	30294.65	18424.51	482.21	700.11	15255.11
Long Rods	5237.16	1538.86	388.50	1105.01	757.37	35765.23	578.65	2450.38	7627.56
Long Dendritic	13807.07	1538.86	1683.48	3315.04	2272.10	23843.49	771.53	8051.26	40521.39
Echinate elongate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stomata	0.00	0.00	0.00	0.00	0.00	2167.59	0.00	0.00	0.00
Hairs	0.00	153.89	388.50	3867.55	757.37	11921.74	0.00	1400.22	476.72
Papillae	476.11	307.77	388.50	0.00	0.00	0.00	0.00	0.00	1906.89
Sedge Achene	0.00	1077.00	1035.99	0.00	0.00	0.00	0.00	0.00	0.00
Trichomes	952.21	769.43	129.50	1657.52	757.37	1083.79	0.00	350.05	0.00
Prickle	0.00	307.77	388.50	1105.01	757.37	0.00	0.00	350.05	0.00
Ovals	0.00	0.00	388.50	2210.03	757.37	1083.79	0.00	2450.38	1430.17
Bottleshaped	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bulliform	40469.00	16157.99	10489.37	50278.10	78008.71	40100.41	11572.96	21353.33	30986.95
Cuneiform	29042.46	11387.54	6604.42	19890.24	64376.12	4335.18	5593.60	16452.57	38137.78
Oryza Cuneiform	476.11	307.77	0.00	3315.04	757.37	3251.38	0.00	2100.33	953.44
Crenates	0.00	0.00	0.00	1657.52	0.00	1083.79	0.00	350.05	0.00
Bilobes	3332.74	769.00	647.49	29835.36	757.37	85619.80	289.32	4200.66	6197.39
cf Setaria bilobe	476.11	0.00	129.50	2210.03	0.00	6502.77	0.00	350.05	476.72
cf Oryza bilobe	0.00	462.00	0.00	3315.04	0.00	24927.28	0.00	700.11	1906.89
1/2 Bilobe	0.00	307.77	0.00	3867.55	0.00	5418.97	192.88	350.05	1906.89
Cross	952.21	153.89	0.00	4420.05	0.00	22759.69	0.00	1400.22	953.44
Polylobes	0.00	0.00	0.00	552.51	0.00	0.00	0.00	700.11	476.72
Rondels	23329.19	1846.63	3107.96	9392.61	6058.93	32513.85	675.09	5250.82	21929.23
cf Stipa Rondel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	700.11	953.44
Saddles	6189.38	1077.20	388.50	11050.13	2272.10	11921.74	192.88	2450.38	10487.89
Collapsed Saddle	0.00	461.66	129.50	0.00	0.00	2167.59	0.00	350.05	2860.33
Flat Tower	0.00	615.54	129.50	0.00	0.00	2167.59	0.00	350.05	0.00
Horned Tower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cones	0.00	0.00	129.50	552.51	757.37	2167.59	0.00	1050.16	953.44
Echinate Spheroid	1428.32	153.89	1812.98	0.00	0.00	3251.38	0.00	1750.27	9534.45
Smooth Spheroid	0.00	153.89	129.50	4972.56	0.00	0.00	96.44	1750.27	3813.78
Verrucate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	700.11	953.44
Crescent	0.00	153.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elongate	0.00	0.00	388.50	0.00	2272.10	0.00	0.00	350.05	2860.33
Tracheids	476.11	307.77	129.50	4420.05	0.00	0.00	0.00	2100.33	1430.17
2 Tiered	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trapeziform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blocks	0.00	615.54	129.50	3315.04	1514.73	0.00	578.65	350.05	953.44
Echinate Blocks	0.00	0.00	0.00	552.51	1514.73	0.00	0.00	0.00	953.44
Platey	0.00	0.00	0.00	0.00	2272.10	0.00	0.00	350.05	0.00
Sheet	476.11	307.77	388.50	1105.01	3029.46	1083.79	96.44	0.00	0.00
Perforated Sheet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	350.05	0.00
Single Polyhedron	476.11	1231.08	517.99	0.00	757.37	0.00	289.32	700.11	0.00

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-Kodumanal PRR-Perur Man-Mantai

	GBSN-I2	GBSN-I3	GBSN-I4	GBSN-I5	GBSN-I6	GBSN-I8	GBSN-I17	GBSN-J1	GBSN-J5
Scalloped	0.00	615.54	0.00	0.00	1514.73	0.00	385.77	700.11	476.72
Single Jigsaw pu	0.00	0.00	0.00	2762.53	0.00	0.00	0.00	350.05	0.00
Leaf/culm indet	1031.56	46.17	3755.45	26520.32	6058.93	106645.42	0.00	5040.79	2298.48
Leaf/culm jigsaw	0.00	0.00	517.99	0.00	0.00	0.00	0.00	140.02	51.08
Leaf/culm ronde	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm bilobe	0.00	0.00	259.00	552.51	0.00	13005.54	0.00	350.05	0.00
Leaf/culm saddle	0.00	0.00	0.00	552.51	0.00	6502.77	0.00	0.00	51.08
Leaf/culm cross	0.00	0.00	64.75	552.51	0.00	5202.22	0.00	0.00	51.08
Leaf/culm oryza	0.00	0.00	259.00	1657.52	0.00	13005.54	0.00	70.01	0.00
Leaf/culm long c	238.05	0.00	7510.91	3867.55	0.00	10404.43	0.00	140.02	0.00
Leaf/culm stoma	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Smoo	0.00	0.00	64.75	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Echin	79.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	357.54
Leaf/culm Phrag	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm reed	0.00	0.00	0.00	0.00	0.00	3901.66	0.00	140.02	0.00
Leaf/culm Panic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Square cells leaf	317.40	0.00	517.99	3867.55	0.00	2601.11	0.00	210.03	510.77
Indet. husk	0.00	15.39	1812.98	13260.16	0.00	15606.65	0.00	1470.23	1123.70
cf. Setaria Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cf. Panicum Hus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Millet type 1 hu	0.00	0.00	323.75	0.00	0.00	0.00	0.00	0.00	0.00
Millet type 2 hu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.01	0.00
cf. Oryza Husk	0.00	0.00	323.75	1105.01	0.00	0.00	0.00	280.04	0.00
cf. Triticum Hus	1190.26	16.00	64.75	2210.03	5302.00	1300.55	0.00	140.02	2911.41
Cyperaceae	0.00	0.00	129.50	1105.01	0.00	0.00	0.00	70.01	0.00
Polyhedron	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hair Base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	140.02	0.00
Multi-Tiered for	0.00	0.00	323.75	6077.57	0.00	2601.11	24.11	1050.16	204.31
Mesophyll	0.00	0.00	0.00	0.00	0.00	0.00	0.00	420.07	0.00
Indet.dicot	0.00	46.17	129.50	0.00	757.37	0.00	0.00	140.02	51.08
Indet .Multicell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	140.02	0.00
Indet.phytolith	317.40	246.22	0.00	6077.57	7573.66	0.00	0.00	140.02	1532.32
Diatoms	3015.34	61.55	388.50	11050.13	3029.46	0.00	313.43	70.01	1379.09
Sponge Spicules	0.00	0.00	0.00	0.00	0.00	0.00	0.00	140.02	0.00

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-  
Kodumanal PRR-Perur Man-Mantai

	GBSN-J7	GBSN-J8	GBSN-J10	GBSN-J12	GBSN-J13	GBSN-J18	GBSN-J20	GBSN-J22	GBSN-J25
Long Smooth	29467.84	36009.81	6925.38	20740.46	41458.20	33959.69	36453.78	77855.27	36404.04
Long Sinuate	20236.95	18198.51	2438.51	5270.12	6948.30	9879.18	5755.86	7108.53	11676.77
Long Rods	2485.24	2710.42	1170.49	6460.14	4863.81	9261.73	5755.86	2708.01	1030.30
Long Dendritic	12781.23	25168.15	3121.30	5270.12	15749.48	16979.85	16628.04	6431.52	20949.49
Echinate elongate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stomata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hairs	1065.10	2323.21	390.16	2040.04	1158.05	308.72	959.31	5077.52	1717.17
Papillae	710.07	774.40	97.54	170.00	0.00	308.72	0.00	0.00	686.87
Sedge Achene	0.00	9292.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trichomes	0.00	2323.21	390.16	680.01	2084.49	1234.90	2238.39	677.00	1717.17
Prickle	355.03	1161.61	292.62	170.00	694.83	308.72	0.00	338.50	0.00
Ovals	355.03	0.00	195.08	340.01	0.00	617.45	319.77	0.00	0.00
Bottleshaped	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bulliform	21302.06	25168.15	7608.17	4930.11	13664.99	20067.09	14069.88	8462.53	25757.58
Cuneiform	19881.92	17424.10	1853.27	1870.04	2316.10	10496.63	6395.40	677.00	6868.69
Oryza Cuneiform	1065.10	387.20	97.54	340.01	463.22	1234.90	319.77	677.00	0.00
Crenates	0.00	0.00	0.00	0.00	231.61	0.00	0.00	0.00	343.43
Bilobes	8875.86	3097.62	1950.81	5270.12	9032.79	7409.39	9593.10	11170.54	22323.23
cf Setaria bilobe	0.00	0.00	0.00	170.00	0.00	0.00	319.77	677.00	1030.30
cf Oryza bilobe	1065.10	1548.81	292.62	1700.04	2547.71	3087.24	2238.39	1354.00	1717.17
1/2 Bilobe	3195.31	774.40	390.16	850.02	926.44	617.45	319.77	677.00	3090.91
Cross	2130.21	387.20	390.16	1700.04	1389.66	0.00	959.31	677.00	1717.17
Polylobes	355.03	0.00	97.54	340.01	0.00	0.00	319.77	0.00	686.87
Rondels	8520.82	3484.82	1170.49	2550.06	2084.49	4322.14	5436.09	3385.01	7212.12
cf Stipa Rondel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saddles	4260.41	7356.84	1072.95	2720.06	2084.49	2161.07	2558.16	3046.51	7898.99
Collapsed Saddle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	677.00	1030.30
Flat Tower	710.07	774.40	0.00	0.00	231.61	0.00	0.00	338.50	0.00
Horned Tower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cones	0.00	774.40	0.00	170.00	0.00	0.00	0.00	338.50	0.00
Echinate Spheroid	8520.82	6195.24	780.32	680.01	926.44	2161.07	0.00	0.00	1717.17
Smooth Spheroid	2130.21	774.40	195.08	0.00	0.00	0.00	0.00	0.00	0.00
Verrucate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crescent	355.03	0.00	0.00	0.00	0.00	308.72	639.54	0.00	0.00
Elongate	0.00	1548.81	585.24	340.01	231.61	1234.90	639.54	0.00	0.00
Tracheids	2130.21	2710.42	780.32	1020.02	2084.49	308.72	959.31	1692.51	686.87
2 Tiered	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trapeziform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blocks	710.07	387.20	0.00	0.00	231.61	617.45	0.00	0.00	686.87
Echinate Blocks	0.00	387.20	0.00	0.00	0.00	926.17	0.00	0.00	0.00
Platey	355.03	387.20	292.62	0.00	0.00	0.00	0.00	0.00	0.00
Sheet	1065.10	774.40	292.62	680.01	231.61	1234.90	319.77	0.00	343.43
Perforated Sheet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Polyhedron	355.03	0.00	97.54	0.00	0.00	0.00	0.00	0.00	0.00
Scalloped	1065.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Jigsaw puzzle	1065.10	0.00	97.54	340.01	463.22	0.00	0.00	0.00	686.87

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-Kodumanal PRR-Perur Man-Mantai

	GBSN-J7	GBSN-J8	GBSN-J10	GBSN-J11	GBSN-J13	GBSN-J18	GBSN-J20	GBSN-J22	GBSN-J24
Leaf/culm indet	2731.03	9873.66	5803.67	9265.20	18297.20	12040.20	12306.80	33003.80	36747.40
Leaf/culm jigsaw	0.00	96.80	0.00	85.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm rondels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm bilobe	54.62	290.40	48.77	0.00	0.00	205.82	414.84	507.75	0.00
Leaf/culm saddle	0.00	0.00	0.00	0.00	0.00	205.82	276.56	507.75	343.43
Leaf/culm cross	81.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm oryza	27.31	0.00	48.77	0.00	0.00	102.91	138.28	0.00	1717.17
Leaf/culm long cells	136.55	871.21	536.47	1955.04	463.22	2778.52	2212.46	761.63	4121.21
Leaf/culm stomata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Smooth sp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Echinate sp	54.62	96.80	0.00	0.00	0.00	102.91	276.56	253.88	0.00
Leaf/culm Phragmites	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm reed	0.00	0.00	48.77	0.00	0.00	0.00	0.00	253.88	0.00
Leaf/culm Panicum sp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Square cells leaf/culm	109.24	193.60	243.85	510.01	694.83	102.91	414.84	507.75	3434.34
Indet. husk	436.97	1936.01	487.70	1700.04	5095.42	926.17	2350.74	9393.41	7898.99
cf. Setaria Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	343.43
cf. Panicum Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Millet type 1 husk	0.00	0.00	0.00	0.00	0.00	102.91	0.00	0.00	0.00
Millet type 2 husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	343.43
cf. Oryza Husk	81.93	290.40	146.31	170.00	3242.54	102.91	276.56	5331.39	1717.17
cf. Triticum Husk	792.00	1452.01	97.54	1190.03	694.83	411.63	691.39	0.00	2404.04
Cyperaceae	27.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polyhedron	0.00	0.00	0.00	0.00	0.00	0.00	0.00	253.88	0.00
Hair Base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multi-Tiered forms	136.55	387.20	243.85	255.01	694.83	205.82	276.56	1015.50	1717.17
Mesophyll	27.31	484.00	146.31	595.01	463.22	308.72	829.67	1269.38	0.00
Indet.dicot	27.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Indet .Multicell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Indet.phytolith	573.52	2226.41	0.00	170.00	463.22	823.27	553.12	253.88	686.87
Diatoms	846.62	677.60	195.08	340.01	0.00	5351.22	1935.91	0.00	3434.34
Sponge Spicules	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-Kodumanal PRR-Perur Man-Mantai

	KDM-5	KDM-9	KDM-10	KDM-11	PRR-15	PRR-16A	PRR-17	PRR-18
Long Smooth	96584.58	234231.8	176868.1	29363.62	33239.60	15833.81	3801.15	14992.81
Long Sinuate	13797.80	49025.27	25883.14	3817.27	9210.97	4262.95	493.66	881.93
Long Rods	5519.12	27236.26	10784.64	4991.82	4004.77	4059.95	444.29	1411.09
Long Dendritic	7358.83	51748.89	49609.35	3523.63	2002.39	5074.94	345.56	4233.27
Echinate elongate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stomata	0.00	0.00	0.00	0.00	0.00	0.00	49.37	0.00
Hairs	0.00	5447.25	4313.86	0.00	800.95	1420.98	246.83	176.39
Papillae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sedge Achene	919.85	0.00	0.00	587.27	0.00	0.00	0.00	0.00
Trichomes	11038.24	21789.01	17255.43	1174.54	800.95	1826.98	296.19	0.00
Prickle	5519.12	0.00	0.00	880.91	0.00	0.00	49.37	529.16
Ovals	4599.27	5447.25	4313.86	1468.18	0.00	406.00	49.37	176.39
Bottleshaped	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bulliform	106702.9	108945.0	49609.35	7047.27	18822.42	15833.81	1678.43	14816.43
Cuneiform	16557.36	16341.76	4313.86	293.64	2002.39	4668.94	641.75	2116.63
Oryza Cuneiform	4599.27	5447.25	0.00	0.00	1601.91	1420.98	197.46	176.39
Crenates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bilobes	13797.80	54472.52	56080.13	9983.63	9210.97	7916.91	1727.80	4409.65
cf Setaria bilobe	2759.56	2723.63	0.00	293.64	0.00	1217.99	98.73	352.77
cf Oryza bilobe	2759.56	21789.01	10784.64	880.91	1201.43	406.00	49.37	1058.32
1/2 Bilobe	6438.97	35407.14	10784.64	0.00	2002.39	608.99	296.19	1234.70
Cross	0.00	19065.38	8627.71	1468.18	2002.39	2232.97	493.66	529.16
Polylobes	0.00	5447.25	8627.71	1468.18	0.00	203.00	49.37	176.39
Rondels	25755.89	147075.8	75492.49	15269.08	10412.40	4871.94	1086.04	4409.65
cf Stipa Rondel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saddles	29435.30	76261.52	51766.28	6460.00	10011.93	3653.96	789.85	6879.06
Collapsed Saddle	0.00	13618.13	2156.93	0.00	0.00	203.00	49.37	0.00
Flat Tower	919.85	0.00	2156.93	587.27	2803.34	0.00	0.00	0.00
Horned Tower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cones	2759.56	0.00	4313.86	587.27	1601.91	608.99	0.00	0.00
Echinate Spheroid	5519.12	49025.27	47452.42	4110.91	400.48	5074.94	197.46	176.39
Smooth Spheroid	2759.56	2723.63	10784.64	0.00	400.48	203.00	98.73	0.00
Verrucate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crescent	0.00	2723.63	0.00	0.00	0.00	0.00	0.00	0.00
Elongate	3679.41	5447.25	8627.71	1174.54	800.95	1014.99	197.46	176.39
Tracheids	0.00	10894.50	6470.78	2936.36	1201.43	608.99	98.73	1411.09
2 Tiered	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trapeziform	5519.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blocks	0.00	0.00	2156.93	0.00	0.00	0.00	0.00	0.00
Echinate Blocks	1839.71	0.00	0.00	0.00	0.00	203.00	0.00	0.00
Platey	2759.56	0.00	2156.93	293.64	400.48	203.00	0.00	0.00
Sheet	4599.27	0.00	6470.78	1761.82	400.48	608.99	49.37	176.39
Perforated Sheet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Polyhedron	1839.71	2723.63	0.00	293.64	400.48	811.99	0.00	0.00
Scalloped	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Jigsaw puzzle	0.00	0.00	0.00	293.64	0.00	0.00	0.00	176.39

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-Kodumanal PRR-Perur Man-Mantai

	KDM-5	KDM-9	KDM-10	KDM-11	PRR-15	PRR-16A	PRR-17	PRR-18
Leaf/culm indet	137977.9	980505.3	224320.5	137421.7	27256.47	16469.62	3277.88	12302.93
Leaf/culm jigsaw	0.00	0.00	0.00	0.00	0.00	135.33	0.00	0.00
Leaf/culm rondels	0.00	0.00	0.00	880.91	0.00	0.00	0.00	0.00
Leaf/culm bilobe	0.00	36768.95	8627.71	0.00	0.00	406.00	245.84	132.29
Leaf/culm saddle	0.00	0.00	4313.86	880.91	332.40	135.33	122.92	396.87
Leaf/culm cross	0.00	36768.95	0.00	0.00	0.00	270.66	40.97	0.00
Leaf/culm oryza	0.00	12256.32	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm long cells	0.00	12256.32	25883.14	0.00	2659.17	811.99	450.71	264.58
Leaf/culm stomata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Smooth spher	0.00	0.00	0.00	0.00	332.40	0.00	0.00	0.00
Leaf/culm Echinate spher	0.00	0.00	4313.86	880.91	0.00	270.66	0.00	0.00
Leaf/culm Phragmites s	0.00	0.00	4313.86	0.00	0.00	406.00	0.00	0.00
Leaf/culm reed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Panicum sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Square cells leaf/culm	3679.41	36768.95	8627.71	4404.54	2991.56	1353.32	122.92	264.58
Indet. husk	4599.27	171588.4	125101.8	19379.99	5983.13	3383.29	901.42	2910.37
cf. Setaria Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cf. Panicum Husk	0.00	0.00	0.00	0.00	0.00	0.00	81.95	0.00
Millet type 1 husk	919.85	0.00	0.00	6166.36	1329.58	135.33	0.00	132.29
Millet type 2 husk	2759.56	0.00	0.00	2642.73	0.00	0.00	204.87	0.00
cf. Oryza Husk	4599.27	73537.90	77649.42	2642.73	332.40	2029.98	245.84	793.74
cf. Triticum Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2116.63
Cyperaceae	919.85	0.00	4313.86	2642.73	2991.56	676.66	81.95	396.87
Polyhedron	0.00	0.00	0.00	880.91	1329.58	541.33	0.00	0.00
Hair Base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multi-Tiered forms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mesophyll	0.00	0.00	0.00	0.00	332.40	0.00	0.00	0.00
Indet.dicot	0.00	24512.63	12941.57	2642.73	332.40	270.66	81.95	132.29
Indet .Multicell	0.00	0.00	0.00	880.91	997.19	406.00	0.00	0.00
Indet.phytolith	0.00	0.00	0.00	0.00	0.00	270.66	0.00	0.00
Diatoms	919.85	24512.63	4313.86	880.91	0.00	0.00	40.97	0.00
Sponge Spicules	919.85	24512.63	4313.86	880.91	0.00	0.00	40.97	0.00

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-Kodumanal PRR-Perur Man-Mantai

	Man-11	Man-13	Man-16A	Man-20 Lower Pit	Man-37	Man-44	Man-45	Man-50	Man-52
Long Smooth	23737.07	13476.56	42622.51	5905.77	21460.84	13751.17	32291.22	9645.59	30037.14
Long Sinuate	4128.19	1554.99	16393.27	527.30	9905.00	4792.07	11604.66	1929.12	3640.87
Long Rods	4902.22	1451.32	5464.42	738.22	17058.62	4375.37	2018.20	1286.08	1517.03
Long Dendritic	7740.35	1140.32	14207.50	527.30	24212.23	5417.13	11100.11	5305.07	8495.35
Echinate elongate		0.00	0.00	0.00	0.00	0.00	504.55	1768.36	2427.24
Stomata	258.01	0.00	0.00	0.00	2201.11	0.00	0.00	160.76	0.00
Hairs	1032.05	621.99	2550.06	105.46	3301.67	416.70	2018.20	482.28	1820.43
Papillae	0.00	0.00	0.00	210.92	1100.56	416.70	0.00	0.00	303.41
Sedge Achene	1032.05	0.00	0.00	0.00	0.00	0.00	0.00	321.52	5764.70
Trichomes	2322.10	311.00	1092.88	421.84	2751.39	0.00	0.00	1125.32	1820.43
Prickle	0.00	103.67	1092.88	0.00	550.28	1666.81	1009.10	482.28	0.00
Ovals	0.00	0.00	1092.88	210.92	0.00	0.00	2522.75	321.52	1820.43
Bottleshaped	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bulliform	4386.20	3213.64	13843.21	2952.88	8804.45	13959.52	19172.91	4662.04	7888.54
Cuneiform	1032.05	103.67	728.59	316.38	3851.95	1666.81	2018.20	1446.84	303.41
Oryza Cuneiform	0.00	103.67	364.29	0.00	1650.83	0.00	0.00	321.52	0.00
Crenates	0.00	0.00	0.00	0.00	1650.83	0.00	0.00	0.00	0.00
Bilobes	5160.23	1243.99	6193.01	105.46	15407.78	6042.18	16650.16	2572.16	13046.44
cf Setaria bilobe	516.02	0.00	0.00	0.00	0.00	625.05	1513.65	482.28	303.41
cf Oryza bilobe	1290.06	0.00	0.00	0.00	4952.50	208.35	2018.20	1125.32	910.22
1/2 Bilobe	516.02	103.67	1092.88	0.00	550.28	625.05	1009.10	321.52	910.22
Cross	1806.08	311.00	1092.88	0.00	6603.34	2916.92	7063.70	964.56	2427.24
Polylobes	258.01	0.00	364.29	0.00	550.28	208.35	504.55	482.28	606.81
Rondels	7482.34	2695.31	5828.72	0.00	4952.50	3750.32	8577.36	2411.40	7888.54
cf Stipa Rondel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saddles	8772.40	1865.98	4735.83	105.46	10455.28	3958.67	11100.11	3536.72	8191.95
Collapsed Saddle	258.01	0.00	364.29	105.46	1100.56	625.05	504.55	160.76	0.00
Flat Tower	1032.05	103.67	364.29	0.00	0.00	208.35	504.55	803.80	0.00
Horned Tower	0.00	0.00	728.59	0.00	0.00	0.00	0.00	0.00	0.00
Cones	774.03	103.67	728.59	105.46	1100.56	0.00	1009.10	482.28	0.00
Echinate Spheroid	6966.31	2384.31	8378.78	738.22	6603.34	13542.82	16650.16	3858.24	108619.1
Smooth Spheroid	0.00	103.67	364.29	0.00	2201.11	3958.67	1009.10	160.76	303.41
Verrucate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crescent	0.00	0.00	0.00	0.00	1650.83	0.00	504.55	0.00	303.41
Elongate	0.00	207.33	364.29	105.46	0.00	0.00	0.00	482.28	3944.27
Tracheids	1548.07	1036.66	2185.77	527.30	8804.45	3333.62	2522.75	1286.08	4551.08
2 Tiered	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	303.41
Trapeziform		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blocks	0.00	0.00	0.00	0.00	6603.34	0.00	0.00	964.56	0.00
Echinate Blocks	0.00	0.00	1457.18	0.00	0.00	0.00	1513.65	0.00	0.00
Platey	516.02	207.33	0.00	0.00	0.00	416.70	1009.10	0.00	303.41
Sheet	1290.06	2695.31	6921.60	0.00	4402.22	1041.76	2018.20	482.28	910.22
Perforated Sheet	0.00	0.00	364.29	0.00	0.00	0.00	1513.65	0.00	0.00
Single Polyhedron	516.02	0.00	364.29	210.92	2751.39	1458.46	0.00	1125.32	0.00
Scalloped	774.03	0.00	728.59	0.00	4952.50	2708.56	504.55	0.00	0.00
Single Jigsaw puzzle	516.02	0.00	364.29	0.00	0.00	208.35	1009.10	321.52	1517.03

Appendix VII: Phytolith numbers per gram, all sites. TKW-Tokwa GBSN- Golbai Sasan KDM-  
Kodumanal PRR-Perur Man-Mantai

	Man-11	Man-13	Man-16A	Man-20 Lower Pit	Man-37	Man-44	Man-45	Man-50	Man-52
Leaf/culm indet	25543.1	15483.1	40983.19	4613.88	15132.6	6406.80	65086.9	12700.0	42476.7
Leaf/culm jigsaw	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm rondels		0.00	0.00	0.00	275.14	0.00	0.00	160.76	303.41
Leaf/culm bilobe		0.00	0.00	0.00	1375.70	1250.11	504.55	0.00	606.81
Leaf/culm saddle		0.00	0.00	0.00	0.00	0.00	1009.10	0.00	606.81
Leaf/culm cross		0.00	0.00	0.00	0.00	0.00	504.55	0.00	0.00
Leaf/culm oryza		0.00	0.00	0.00	275.14	1250.11	4036.40	0.00	0.00
Leaf/culm long cells	3870.17	0.00	1229.50	131.83	0.00	0.00	5550.05	3220.16	0.00
Leaf/culm stomata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm Smooth sp	0.00	0.00	0.00	0.00	0.00	0.00	504.55	0.00	0.00
Leaf/culm Echinata s	0.00	266.95	0.00	0.00	1375.70	1250.11	0.00	2427.24	2427.24
Leaf/culm Phragmite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaf/culm reed	1548.07	0.00	1229.50	0.00	275.14	468.79	1513.65	0.00	0.00
Leaf/culm Panicum s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Square cells leaf/cul	774.03	133.48	1229.50	0.00	0.00	156.26	1009.10	910.22	910.22
Indet. husk	14706.6	3870.78	10245.80	2372.85	2476.25	3281.53	25227.5	6068.11	6068.11
cf. Setaria Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cf. Panicum Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Millet type 1 husk	0.00	133.48	0.00	0.00	0.00	0.00	0.00	321.52	0.00
Millet type 2 husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	303.41
cf. Oryza Husk	84369.8	2936.46	2049.16	659.13	825.42	937.58	7063.70	8198.75	13956.6
cf. Triticum Husk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	5418.24	0.00	2868.82	527.30	0.00	1250.11	4036.40	321.52	0.00
Polyhedron	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hair Base	0.00	0.00	409.83	0.00	0.00	0.00	0.00	0.00	0.00
Multi-Tiered forms	0.00	0.00	0.00	0.00	0.00	468.79	0.00	0.00	0.00
Mesophyll	0.00	0.00	2458.99	0.00	0.00	0.00	2018.20	643.04	303.41
Indet.dicot	774.03	0.00	409.83	0.00	1375.70	0.00	3027.30	482.28	2123.84
Indet .Multicell	0.00	0.00	1639.33	0.00	0.00	0.00	2522.75	0.00	0.00
Indet.phytolith	0.00	0.00	0.00	0.00	7703.89	781.32	2522.75	0.00	0.00
Diatoms	3096.14	0.00	0.00	131.83	0.00	312.53	0.00	160.76	303.41
Sponge Spicules	2322.10	0.00	0.00	790.95	550.28	0.00	504.55	160.76	0.00



Figure A: A  
Cucurbitaceae type  
scalloped phytolith from  
Tokwa, sample 15.

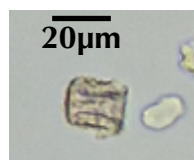


Figure B:  
Comelinaceae type  
single cell

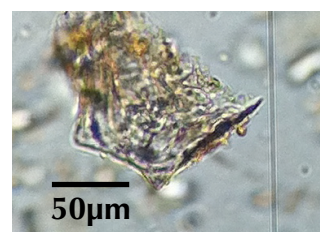


Figure C: Double peaked  
glume cell from *Oryza* sp.

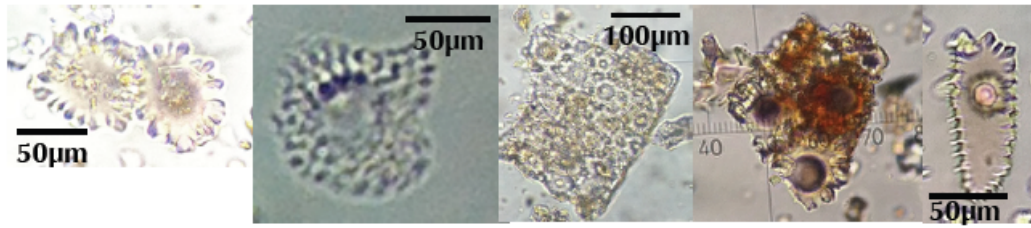


Figure E: Sedge achene phytoliths

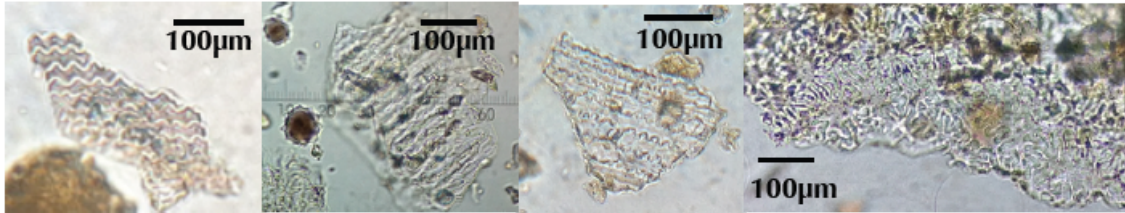


Figure F: Husk multi-cells, left to right- indet., cf. *Oryza* sp., indet. millet type 2.

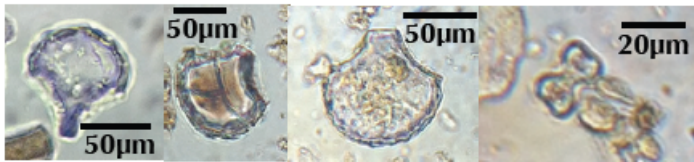
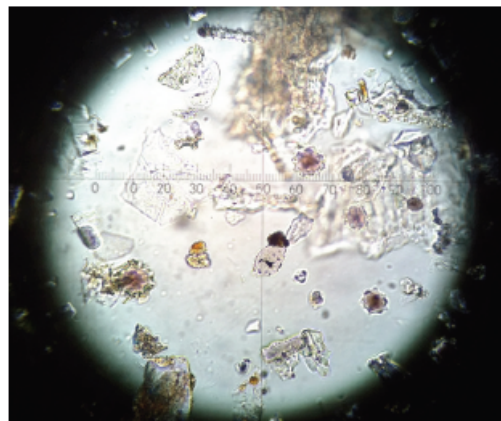


Figure G: *Oryza* sp. single cells. Cuneiform bulliforms on the left, bilobe on the right.



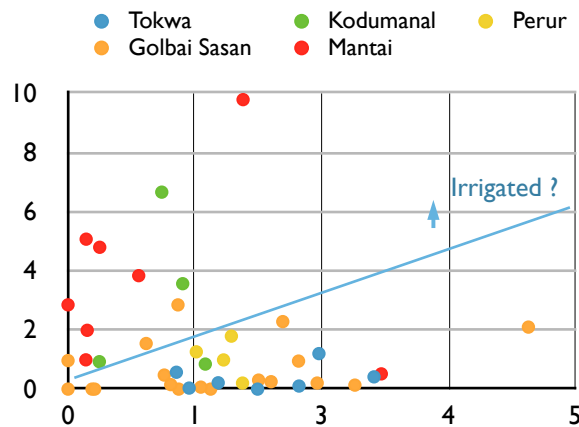
Figure H: Left- bilobe multi-cell leaf/culm panel. Right- Bulliform multi-cell leaf/culm panel.

Figure I: A typical view down the microscope at sample 52 from Mantai. Note the high occurrence of echinate spheroids.



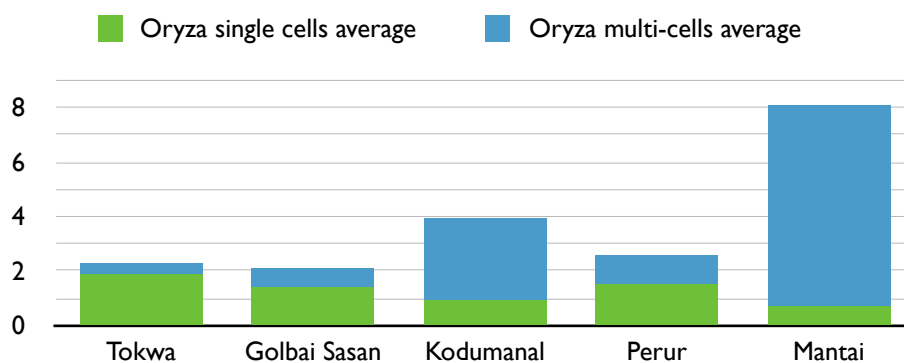
Appendix VIII: Rice single cell:multi-cell ratios.

The relative frequencies of cf. *Oryza* sp. single cells and multi-cell panels in phytolith samples from all sites were plotted in a scatter plot, in order to identify possible irrigation of the rice crop. This method follows the theory outlined by Madella et al. (2009) that irrigated cereal crops will produce a higher proportion of multi-cell panels than a non-irrigated cereal crop.



**Figure A: Scatter plot of cf. *Oryza* sp. single and multi-cell frequencies.**

13 samples contained higher frequencies of multi-cell panels than single cells, suggesting possible irrigation of the crop. These samples are from Golbai Sasan, Kodumanal and Mantai. However several other samples from these sites had much higher frequencies of single cells than multi-cell panels. Therefore the average frequency of single and multi-cells were calculated. Figure A clearly shows that Kodumanal and Mantai have much higher multi-cell panel frequencies than single cell frequencies. This suggests high water levels, however this is contradictory to the rest of the data. The obvious reason for this is an identification bias. Where rice type multi-cell panels are present, they are often easier to identify as cf. *Oryza* than single cells.



**Figure B: Bar chart showing the average relative frequencies of cf. *Oryza* single and multi-cell panels.**

Bearing in mind possible preservation biases that are indicated in the data, e.g. the universal poor preservation of macro remains and the mixed sources of waste at Mantai, it was decided that whilst this method may be useful, CA provides a more holistic view of the data.

Appendix IX: Functional and biological attributes of weeds identified in macrobotanical samples, following Jones et al. (2005, 2010). Information from: Galinato et al 1999, Haines 1925, Jacquot and Courtois 1987, Matthew 1988, Moody 1989, Nasir and Ali 1982, Noda et al 1985, Sahu 1992, Saldanha 1984, Sharma et al 1996, Singh and Walia 2010, Tadulingam and Ventatanarayana 1985, Soerjani et al 1987, [theplantlist.org](http://theplantlist.org), [plants.usda.gov](http://plants.usda.gov), [kew.org/data](http://kew.org/data).

Taxa	Notes	Ecology	Biological and Functional attributes
<i>Bromus ramosus</i>	Hairy brome. Native to Europe and SW Asia.	Prefers shady sites and well drained soils. Found along hedgerows and in woodland margins in Europe. Unlikely to be a rice weed, however likely dispersed with SW Asian crops into India. A minor weed of wheat/barley fields.	Up to 1.5m in height. Seed size and dormancy are less than in other Bromus species. <b>Positive potential productivity.</b>
<i>Chenopodium</i> sp.	The goosefoots. Around 200 species, including <i>C. album</i> or 'bathuwa' cultivated in, but not native to, N India, and <i>C. giganteum</i> "tree spinach".	A cosmopolitan genus. Tend to prefer rich soils.	Can grow up to 2m in height. Many species produce many seeds. <b>Unclear.</b>
Poaceae (small grass)	The grasses. The fifth largest plant family, over 10,000 species.	Poaceae are found in every environment, except the poles.	The family is too large and varied to describe functional attributes. <b>Unclear.</b>
cf. <i>Lolium</i> sp.	The ryegrasses. 9 species, including <i>L. perenne</i> , <i>L. temulentum</i> and <i>L. persicum</i> .	<i>Lolium</i> sp. is an important pasture plant in the temperate zones, where it outcompetes other species.	Produce large numbers of seed. Little dormancy. Little vegetative reproduction and correspondingly small root system. <b>Unclear.</b>

Table I: Tokwa



Taxa	Notes	Ecology	Biological and Functional attributes
<i>Commelina</i> sp.	Dayflowers. 170 species. 7 species are native to India including <i>Commelina benghalensis</i> , <i>C. carolinaria</i> , <i>C. paludosa</i> and <i>C. undulate</i> (book ref.)	Most species are found in wet lands, swamps and along rivers. <i>C. benghalensis</i> is a common weed of wet fields and crops across Asia and is a serious weed of a variety of crops (including rice) in India.	Flowers and germinates throughout the growing season. Generally produce one large seed and four smaller seeds. Smaller seeds have a strong dormancy. Larger seeds can emerge from depths of up to 6” (GISD 2014) <b>Disturbance</b>
Cyperaceae	The sedges. Around 5,000 species, 110 genera. 1000s of species native to India, although no clear estimate is available.	Can be found in nearly all environments, but most are associated with wetlands. Another serious weed of rice, with <i>Cyperus iria</i> , <i>Cyperus difformis</i> , <i>Fimbristylis miliacea</i> and <i>Schoenoplectus juncooides</i> all native to India and listed under IRRI’s dirty dozen (IRRI 2014).	Many sedges reproduce both vegetatively and with seeds. Some rely primarily on vegetative reproduction. Horizontal root systems can be very large. Seeds are often small (e.g. <i>Fimbristylis</i> sp.) but can be large (e.g. <i>Schoenoplectus</i> sp.). Those identified here were of an average size for sedges. <b>Unclear</b>
<i>Echinochloa</i> sp.	A genus of grasses which includes several millet crops. Around 35 species, including <i>E. frumentaceae</i> .	Several species are weeds of crops, including <i>E. colona</i> and <i>E. crus-galli</i> which are both members of IRRI’s dirty dozen. <i>E. colona</i> is a mimic weed of rice which looks very similar during the vegetative stage. Generally prefer moist and wet fields. Some species can live in aquatic conditions.	Flowers throughout the year. Seeds have a short dormancy, but some plants can produce a large number of seeds (inc. <i>E. crus-galli</i> @ <40,000 a year). Can reproduce vegetatively. Some species produce many, large rhizomes. Plants are responsive to nutrients. Up to 1.5m tall. <b>Disturbance. Positive potential productivity.</b>
cf. <i>Ipomoea</i> sp.	The morning glories. Around 500 species. Approx. 26 native to India, as recorded in Haines (1925)	Some species prefer dry scrubland, others are semi-aquatic. Ipomoeas were identified in several rice fields during field surveys, however these may have been introduced species.	Generally climbing plants, several produce large tubers most notably the sweet potato ( <i>I. batatas</i> ). <b>Harvesting by uprooting or cutting plant near the base.</b>

Table II: Golbai Sasan

Taxa	Notes	Ecology	Biological and Functional attributes
cf. Liliaceae	The lilies. Around 600 species. 26 species listed as native in Haines (1925).	Liliaceae are found in a wide variety of habitats, with the majority in the Northern Hemisphere.	Often bulbous plants, however this is such a varied family that particular functional attributes cannot be discussed. <b>Unclear</b>
Poaceae	The grasses. The fifth largest plant family, over 10,000 species.	Poaceae are found in every environment, except the poles.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
Potulaceae	The purslanes. Around 100 species. <i>P. oleracea</i> native to India,	Several prefer dry soils, although some are weeds of fields. Some prefer disturbed habitats. <i>P. oleracea</i> is a succulent, however it has been reported as a weed of wet rice fields.	Seeds are generally large (c. 1mm across). Growth habit tends to be spreading. <b>Unclear</b>
cf. <i>Rumex</i> sp.	The docks. Around 200 species. <i>R. angulatus</i> , <i>R. patientia</i> and <i>R. dentatus</i> amongst those reported as native to India.	A typical plant of disturbed areas, also tend to prefer moist areas. <i>R. dentatus</i> in particular can often be found at the edges of cultivated fields throughout Eurasia.	Most species have long tap roots, many grow quite tall (c.70 cm high). <b>Unclear</b>
<i>Schoenoplectus</i> sp.	Club-rushes. Approx. 35 species. 10 species reported native to India.	Club-rushes are wet land residents. <i>S. juncooides</i> is fairly common in wetter rice fields across Asia.	Grows from 10cm to 3m tall, most species are tall. Can propagate vegetatively through rhizomes, also produces nuts which can be quite large( c.1-4mm across). <b>Disturbance. Inter-annual instability of habitat conditions.</b>

Table II cont.: Golbai Sasan

Taxa	Notes	Ecology	Biological and Functional attributes
<i>cf. Scirpus</i> sp.	Another sedge genus, often also called club-rush or bulrush. Around 120 species. How many are native to India is unknown.	An aquatic genus with a cosmopolitan distribution.	Seeds tend to have a long dormancy period, although some can be quite small and therefore have a shorter dormancy. Some species have quite large seeds (c. 2mm across). They can also propagate vegetatively and produce rhizomes. <b>Disturbance. Inter-annual instability of habitat conditions</b>
<i>Sida</i> sp.	Often simply known as the sidas. Approx. 150+ species. 11 species reported as native to India, including <i>S. mysorensis</i> (specific to Mysore) and <i>S. cordifolia</i> .	Botanical texts do not provide much information, however several sidas are common to cultivated ground.	The family is too large and varied to describe functional attributes. <b>Unclear.</b>

Table II cont.: Golbai Sasan

Taxa	Notes	Ecology	Biological and Functional attributes
cf. <i>Andropogon</i> sp.	A genus of grasses. Around 100 species, including <i>A. muricatum</i> , from which vetiver (fragrant oil) is made.	It has been difficult to find info. on Indian Andropogons, however species seem to occur in a variety of habitats.	Tend to reproduce via seeds rather than vegetatively. Some species have seeds that are adapted to catch on animal fur, so prefer areas where 'foot traffic' is high. <b>Unclear.</b>
<i>Cyperus</i> sp.	The largest genera of sedges. Around 600 species worldwide, approx. 70 reported from India (Hooker 1879, Nair and Henry 1983))	Largely adapted to wet lands, river banks and swamps. Common weeds of rice fields, both irrigated and rainfed.	Reproduce vegetatively from rhizomes and also with seeds. Can grow quite tall and horizontal root systems can be large. <b>Disturbance. Positive potential productivity.</b>
Cyperaceae	The sedges. Around 5,000 species, 110 genera. 1000s of species native to India, although no clear estimate is available.	Can be found in nearly all environments, but most are associated with wetlands. Another serious weed of rice, with <i>Cyperus iria</i> , <i>Cyperus difformis</i> , <i>Fimbristylis miliacea</i> and <i>Schoenoplectus juncooides</i> all native to India and listed under IRRI's dirty dozen (IRRI 2014).	Many sedges reproduce both vegetatively and with seeds. Some rely primarily on vegetative reproduction. Horizontal root systems can be very large. Seeds are often small (e.g. <i>Fimbristylis</i> sp.) but can be large (e.g. <i>Schoenoplectus</i> sp.). Those identified here were of an average size for sedges. <b>Unclear</b>

Table III: Gopalpur

<b>Taxa</b>	<b>Notes</b>	<b>Ecology</b>	<b>Biological and Functional attributes</b>
<i>Echinochloa</i> sp.	A genus of grasses which includes several millet crops. Around 35 species, including <i>E. frumentaceae</i> .	Several species are weeds of crops, including <i>E. colona</i> and <i>E. crus-galli</i> which are both members of IRRIs dirty dozen. <i>E. colona</i> is a mimic weed of rice which looks very similar during the vegetative stage. Generally prefer moist and wet fields. Some species can live in aquatic conditions.	Flowers throughout the year. Seeds have a short dormancy, but some plants can produce a large number of seeds (inc. <i>E. crus-galli</i> @ <40,000 a year). Can reproduce vegetatively. Some species produce many, large rhizomes. Plants are responsive to nutrients. Up to 1.5m tall. <b>Disturbance. Positive potential productivity.</b>
cf. <i>Eragrostis</i> sp.	A genus of grasses. 16 species listed in The Botany of Bihar and Odisha.	Several species are fairly common in South Asia. Many species can be found on wet ground or along the banks of rivers. Although some species are found on dry ground.	Plants reproduce by seed and rhizome. Horizontal root systems can be quite substantial. Plants tend to grow to around 60cm high. <b>Unclear</b>
<i>Ischaemum rugosum</i>		A serious weed of lowland rice, one of IRRIs dirty dozen.	Adapted to germinate after other weeds and so avoid early weeding. Aggressive growth, seeds germinate early in the wet season. <b>Positive potential productivity.</b>
Poaceae (small and large grass)	The grasses. The fifth largest plant family, over 10,000 species.	Poaceae are found in every environment, except the poles.	The family is too large and varied to describe functional attributes. <b>Unclear</b>

Table III cont. : Gopalpur

Taxa	Notes	Ecology	Biological and Functional attributes
cf. Aizoaceae	Stone plants. A family or around 135 genera.	Most endemic to arid and semi-arid areas. Many South Asian species are salt tolerant.	Unlikely to be a weed of rice.
Asteraceae	The daisies. Over 1,600 genera and 23,000 species. Includes the <i>Chrysanthemums</i> and <i>Bidens</i> .	Found in a variety of habitats, although mostly distributed within the temperate zone.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
Boraginaceae	The borages Around 146 genera, 2000 species.	The family is distributed worldwide and in a variety of habitats within South Asia.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
cf. Cyperaceae	The sedges. Around 5,000 species, 110 genera. 1000s of species native to India, although no clear estimate is available.	Can be found in nearly all environments, but most are associated with wetlands. Another serious weed of rice, with <i>Cyperus iria</i> , <i>Cyperus difformis</i> , <i>Fimbristylis miliacea</i> and <i>Schoenoplectus juncooides</i> all native to India and listed under IRRI's dirty dozen (IRRI 2014).	Many sedges reproduce both vegetatively and with seeds. Some rely primarily on vegetative reproduction. Horizontal root systems can be very large. Seeds are often small (e.g. <i>Fimbristylis</i> sp.) but can be large (e.g. <i>Schoenoplectus</i> sp.). Those identified here were of an average size for sedges. <b>Unclear</b>
Malvaceae	The mallows. Approximately 243 genera and 4000+ species including <i>Gossypium</i> , <i>Hibiscus</i> and <i>Sida</i> .	The family is distributed worldwide and in a variety of habitats within South Asia.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
cf. <i>Mollugo</i> sp.	Carpet weed. Approximately 20 species.	A broadly distributed tropical and sub-tropical genus. Includes some weeds of cultivated land (e.g. <i>M. pentaphylla</i> ). Some have seeds that are dispersed by water.	Species flower following monsoon rains in South Asia. Most can propagate vegetatively from stem fragments. <b>Disturbance. Seasonal-following monsoon.</b>
Rubiaceae	The bedstraw or madder family. Around 610 genera and 13000 species, including <i>Gardenia</i> and <i>Gallium</i> .	The family is distributed worldwide and in a variety of habitats within South Asia.	The family is too large and varied to describe functional attributes. <b>Unclear</b>

Table IV: Kodumanal

Taxa	Notes	Ecology	Biological and Functional attributes
cf. <i>Stellaria</i> sp.	The chickweeds. Around 110 species.	The genera is distributed worldwide and in a variety of habitats within South Asia.	The genera is too large and varied to describe functional attributes. <b>Unclear</b>

Table IV: Kodumanal

Taxa	Notes	Ecology	Biological and Functional attributes
cf. Aizoaceae	Stone plants. A family or around 135 genera.	Most endemic to arid and semi-arid areas. Many South Asian species are salt tolerant.	Unlikely to be a weed of rice.
Chenopodioideae	A subfamily of Amaranthaceae. APRx. 26 genera, 486 species. Includes <i>Atriplex</i> sp., <i>Chenopodium</i> sp. and <i>Dysphania</i> sp.	This family is distributed worldwide and in a variety of habitats within South Asia.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
Commelinaceae	The dayflowers. Around 40 genera, 650 species, including <i>Commelina benghalensis</i> and <i>Cyanotis</i> sp..	Disributed widely within the tropics and in a variety of habitats,	The family is too large and varied to describe functional attributes. <b>Unclear</b>
cf. Brassicaceae (Cruciferae)	The mustard family. Around 3,700 species within 330 genera. Includes <i>Brassica rapa</i>	This family is distributed worldwide and in a variety of habitats within South Asia.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
cf. Cyperaceae	The sedges. Around 5,000 species, 110 genera. 1000s of species native to India, although no clear estimate is available.	Can be found in nearly all environments, but most are associated with wetlands. Another serious weed of rice, with <i>Cyperus iria</i> , <i>Cyperus difformis</i> , <i>Fimbristylis miliacea</i> and <i>Schoenoplectus juncoides</i> all native to India and listed under IRRI's dirty dozen (IRRI 2014).	Many sedges reproduce both vegetatively and with seeds. Some rely primarily on vegetative reproduction. Horizontal root systems can be very large. Seeds are often small (e.g. <i>Fimbristylis</i> sp.) but can be large (e.g. <i>Schoenoplectus</i> sp.). Those identified here were of an average size for sedges. <b>Unclear</b>
Euphorbiaceae	The spurge family, Approximately 300 genera and 7000 species. including <i>Ricinus communis</i> and <i>Euphorbia esula</i> .	Disributed widely within the tropics and in a variety of habitats,	The family is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Ischaemum</i> sp.	Sometimes known as the murainagrasses. Around 80 species, including <i>I. rugosum</i> .	Found across South Asia and the Old World tropics in a variety of habitats. Includes a serious weed of rice and other species common to rice fields.	Many can reproduce vegetatively and via seed. Most show rapid growth and are very competitive on disturbed soils. <b>Disturbance</b>

Table V: Perur



<b>Taxa</b>	<b>Notes</b>	<b>Ecology</b>	<b>Biological and Functional attributes</b>
Malvaceae	The mallows. Approximately 243 genera and 4000+ species including <i>Gossypium</i> , <i>Hibiscus</i> and <i>Sida</i> .	The family is distributed worldwide and in a variety of habitats within South Asia.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Verbascum scrophularifolium</i>	Unable to find this plant in any reference material.	The Verbascums are generally found on dry soils.	<b>Unclear</b>

Table V cont. : Perur

Taxa	Notes	Ecology	Biological and functional attributes
Amaranthaceae	The Amaranths. Approx. 145 genera (excluding Chenopodioideae), 2,000 species. Includes <i>Celosia argentea</i> and <i>Amaranthus spinosus</i> .	Some are herbs or shrubs, also includes vines and trees. Found in a wide variety of habitats.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
Asteraceae	The daisies. Over 1,600 genera and 23,000 species. Includes the Chrysanthemums and Bidens.	Found in a variety of habitats, although mostly distributed within the temperate zone.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Bulbostylis barbata</i>	Watergrass.	<i>B. barbata</i> frequent on sand dunes and sandy grounds near the sea shore. Also reported from riverbeds and woodland.	Unlikely to be a weed of arable land.
<i>Chenopodium</i> sp.	The goosefoots. Around 200 species, including <i>C. album</i> or 'bathuwa' cultivated in, but not native to, N India, and <i>C. giganteum</i> "tree spinach".	A cosmopolitan genus. Tend to prefer rich soils.	Can grow up to 2m in height. Many species produce many seeds. The family is too large and varied to describe functional attributes. <b>Unclear</b>
Chenopodioideae	A subfamily of Amaranthaceae. APRx. 26 genera, 486 species. Includes <i>Atriplex</i> sp., <i>Chenopodium</i> sp. and <i>Dysphania</i> sp.	This family is distributed worldwide and in a variety of habitats within South Asia.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Coix</i> sp.	Approx. 6 species, including 3 species, <i>C. lacryma-jobi</i> , <i>C. aquatic</i> and <i>C. puellarum</i> native to South Asia .	<i>C. aquatic</i> is an aquatic species, other species are found in dry-damp soils. All species prefer higher elevations c. 500m + and are rarely found in rice fields.	Unlikely to be a weed of arable land.

Table VI: Mantai

Taxa	Notes	Ecology	Biological and functional attributes
<i>Cyperus</i> sp.	The largest genera of sedges. Around 600 species worldwide, approx. 70 reported from India.	Largely adapted to wet lands, river banks and swamps. Common weeds of rice fields, both irrigated and rainfed.	Reproduces vegetatively from rhizomes and also with seeds. Can grow quite tall and horizontal root systems can be large. <b>Disturbance. Positive potential productivity.</b>
Cyperaceae	The sedges. Around 5,000 species, 110 genera. 1000s of species native to India, although no clear estimate is available.	Can be found in nearly all environments, but most are associated with wetlands. Another serious weed of rice, with <i>Cyperus iria</i> , <i>Cyperus difformis</i> , <i>Fimbristylis miliacea</i> and <i>Schoenoplectus juncooides</i> all native to India and listed under IRRI's dirty dozen (IRRI 2014).	Many sedges reproduce both vegetatively and with seeds. Some rely primarily on vegetative reproduction. Horizontal root systems can be very large. Seeds are often small (e.g. <i>Fimbristylis</i> sp.) but can be large (e.g. <i>Schoenoplectus</i> sp.). Those identified here were of an average size for sedges. <b>Unclear</b>
<i>Cyperus digitatus</i>	Finger flatsedge.	A widespread plant of swamps and seasonally flooded areas, though not common in rice fields.	Unlikely to be a weed of arable land.
<i>Cyperus</i> cf. <i>pumilis</i>	Low flatsedge.	Frequent in wetlands and may be found in rice fields.	A small sedge with a large, fibrous root system. <b>Disturbance. Negative potential productivity?</b>
cf. <i>Eleocharis</i> sp.	The spikerushes. A member of the sedge family. Around 250 species, including <i>E. dulcis</i> .	A cosmopolitan genus of aquatic or wet habitats. Many species are found in lowland tropical wetlands. Some species are relatively common weeds of rice.	Many species have rhizomes and reproduce vegetatively as well as through seed production. <b>Unclear</b>

Table VI cont. : Mantai

Taxa	Notes	Ecology	Biological and functional attributes
<i>Echinochloa</i> sp.	A genus of grasses which includes several millet crops. Around 35 species, including <i>E. frumentaceae</i> .	Several species are weeds of crops, including <i>E. colona</i> and <i>E. crus-galli</i> which are both members of IRRI's dirty dozen. <i>E. colona</i> is a mimic weed of rice which looks very similar during the vegetative stage. Generally prefer moist and wet fields. Some species can live in aquatic conditions.	Flowers throughout the year. Seeds have a short dormancy, but some plants can produce a large number of seeds (inc. <i>E. crus-galli</i> @ <40,000 a year). Can reproduce vegetatively. Some species produce many, large rhizomes. Plants are responsive to nutrients. Up to 1.5m tall. <b>Disturbance. Positive potential productivity.</b>
<i>Euphorbia esula</i>	Green spurge.	Prefers dry soils and full sunlight, but can grow in a variety of habitats.	Produces seeds with a good dormancy. Also reproduces vegetatively from a deep and spreading root system. Can grow fairly large (approx. 1m high), however the root system is often much more extensive. <b>Disturbance</b>
<i>Fimbristylis milliacea</i>	Grasslike fimbry.	Common across South and Southeast Asia. A weed of rice, particularly rainfed rice. One of IRRI's dirty dozen.	Up to 50cm in height. Flowers year round and propagates by seed, producing around 10,000 seeds per year. Seeds can germinate immediately and plants reach maturity within 1 month. <b>Disturbance</b>
<i>Galium</i> sp.	The goosegrasses or bedstraws. One of the largest genera of flowering plants. Around 620 species.	Generally found in temperate habitats, cosmopolitan distribution. In South Asia species generally restricted to the Himalayan zone.	Unlikely to be a weed of arable land in Sri Lanka. Perhaps a weed of an imported wheat crop from North India?

Table VI cont. : Mantai

<b>Taxa</b>	<b>Notes</b>	<b>Ecology</b>	<b>Biological and functional attributes</b>
<i>Limnophila</i> sp.	Marshweeds. Approximately 40 species, including c. 10 native to Sri Lanka e.g. <i>L. aquatica</i> and <i>L. heterophylla</i> .	Listed South Asian species are aquatic or semi-aquatic and generally can be found in flooded rice fields, ponds or rivers. <i>L. heterophylla</i> considered a serious weed of deep-water rice in India.	Can propagate vegetatively from stem fragments, as well as through seed. Produces a large number of small seeds once a year. Short lived genus, flowers once a year following monsoon rains. <b>Disturbance.</b> <b>Seasonality.</b>
Poaceae (small grass)	The grasses. The fifth largest plant family, over 10,000 species.	Poaceae are found in every environment, except the poles.	The family is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Rubus</i> sp.	A very large genus, including blackberries, raspberries and tayberries. 13 subgenera and perhaps up to 1000 species, however the literature is unclear.	The genera is distributed worldwide and in a variety of habitats within South Asia.	The genera is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Stellaria</i> sp.	The chickweeds. Around 110 species.	The genera is distributed worldwide and in a variety of habitats within South Asia.	The genera is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Stellaria media</i>	Chickweed.	A cosmopolitan species common to cultivated ground and areas of disturbance. Prefers moist, nitrogen rich soils.	In South Asia chickweed germinates and flowers all year round providing water is available. Can produce 20,000 seeds per plant. Seeds have a short dormancy. Plants are responsive to nutrient levels. <b>Positive potential productivity.</b>

Table VI cont. : Mantai

<b>Taxa</b>	<b>Notes</b>	<b>Ecology</b>	<b>Biological and functional attributes</b>
cf. <i>Solanum</i> sp.	Around 1,500 species, including <i>S. nigrum</i> and <i>S. dulcamara</i> .	The genera is distributed worldwide and in a variety of habitats within South Asia. <i>S. dulcamara</i> itself has been recorded in woodlands, marshes and dry scrubland.	The genera is too large and varied to describe functional attributes. <b>Unclear</b>
cf. Solanaceae	The nightshades. 115 genera, around 4,000 species.	The family is distributed worldwide and in a variety of habitats within South Asia.	This family is too large and varied to describe functional attributes. <b>Unclear</b>
<i>Trianthema</i> cf. <i>triquetra</i>	Black horse purslane or red spinach.	Found in arid regions. Sandy soils and semi-saline disturbed areas.	Unlikely to be an arable weed.

Table VI cont. : Mantai

Appendix X: SAabot.xls data for sites with rice and weeds. Weed taxa present at >10% of sites.

Region	Period	Site name	Amaranthus sp.	Andropogon sp.	Argemone mexicana	Cenchrus ciliaris	Chenopodium album	Chenopodium cf.	Commelina benghalensis L.	Cyperus sp.	Dactyloctenium aegyptium	Datura sp.	Desmodium sp.	Eleocharis sp.	Echinochloa sp.	Eleusine indica	Fimbristylis sp.	Intentionally left blank
Harappan	Harappan	Kunal IC																
	E. Harappan	Kunal IB																
	Late Harappan	Hulas																
	Harappan	Kanmer 2																
	Late Harappan	Kanmer 3																
Ganges	Mesolithic	Damdama																
	Neolithic	Imlidih-Khurd I																
	Neolithic	Imlidih-Khurd II																
	Neolithic	Senuwar IA																
	Neolithic	Senuwar IB																
	Neolithic	Tokwa																
	Neolithic	Narhan I																
	Neolithic	Senuwar 2																
	Neo-IA	Malhar I																
	Iron Age	Charda, I																
	Iron Age	Springaverapura																
	Iron Age	Waina II																
	Iron Age	Charda,																
	Iron Age	Hulaskhera A/B																
	Iron Age	Malhar 2																

Appendix X: SAabot.xls data for sites with rice and weeds. Weed taxa present at >10% of sites.

	Iron Age	Narhan 2																
	Iron Age	Radhan																
	Early Historic	Hulaskhera C/D																
	Early Historic	Manji																
	Early Historic	Sanghol																
	Medieval	Hulaskhera E																
Southern	Early Historic	Perur																
	Early Historic	Kodumanal																
	Early Historic	Mangudi																



Appendix X: SAabot.xls data for sites with rice and weeds. Weed taxa present at >10% of sites.

Region	Period	Site name	Indigofera sp.	Ipomoea sp.	Ischaemum cf. rugosum	Lathyrus aphaca	Melilotus indica/sp.	Panicum sp.	Poa sp.	Polygonum plebeium	Polygonum barbatum	Polygonum sp.	Rumex dentatus	Sida sp.	Trianthema portulacastrum	Trianthema triquetra	Trigonella occulta	Vicia sp.	Vicia sativa
Harappan	Harappan	Kunal IC																	
	E. Harappan	Kunal IB																	
	Late Harappan	Hulas																	
	Harappan	Kanmer 2																	
	Late Harappan	Kanmer 3																	
Ganges	Mesolithic	Damdama																	
	Neolithic	Imlidih-Khurd I																	
	Neolithic	Imlidih-Khurd II																	
	Neolithic	Senuwar IA																	
	Neolithic	Senuwar IB																	
	Neolithic	Tokwa																	
	Neolithic	Narhan I																	
	Neolithic	Senuwar 2																	
	Neo-Iron Age	Malhar I																	
	Iron Age	Charda, I																	
	Iron Age	Springaverapura																	
	Iron Age	Waina II																	

Appendix X: SAabot.xls data for sites with rice and weeds. Weed taxa present at >10% of sites.

	Iron Age	Charda,																
	Iron Age	Hulaskhera A/B																
	Iron Age	Malhar 2																
	Iron Age	Narhan 2																
	Iron Age	Radhan																
	Early Historic	Hulaskhera C/D																
	Early Historic	Manji																
	Early Historic	Sanghol																
	Medieval	Hulaskhera E																
Southern	Early Historic	Perur																
	Early Historic	Kodumanal																
	Early Historic	Mangudi																