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Sustainability vs. Enhancement What is the Future Priority of Land Rehabilitation and Maintenance (LRAM)?

Jeffrey Andrews

**US Army Europe
ITAM Operations Manager**

jeffrey.a.andrews@us.army.mil

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Integrated Training Area Management (ITAM)



- ITAM is one of two DA G3 “Enabler” programs (RTLP and ITAM) that supports the objectives of the Army Sustainable Range Program (SRP) with the **goal of maximizing the capability, availability, and accessibility of ranges and training land. (AR 350-19)**
- Command: Execute USAREUR SRP Within Operations / Training Channels
- Overall: Manage The Army’s Training Land “Platform” To Sustain Its Future Use For Training by:
 1. Sustainable Range Awareness
 2. Range and Training Land Assessment
 3. Training Requirements Integration
 4. **Land Rehabilitation and Maintenance**



ITAM emerged nearly 25 years ago.

What began as a scientific evaluation of natural resource management on lands supporting military-mission activities, evolved into a world-class model for the management of military lands and strategic enabler supporting military readiness.

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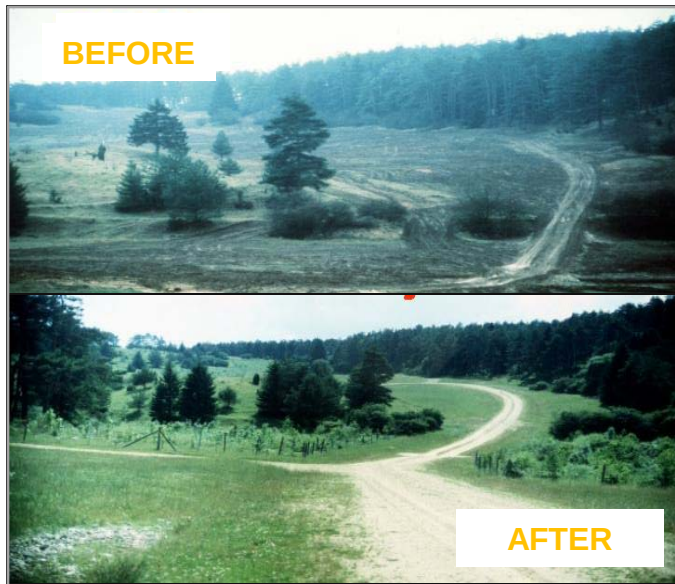


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ITAM Land Repair Examples

Over \$55M in land repair projects executed in FY04-09



JMRC Hohenfels



Grafenwoehr



Pre-ITAM



BEFORE



AFTER

12 SEP 2007

JMRC Hohenfels

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What Drives LRAM

LRAM Doctrine Examples:

AR 350-19

5-4. Land rehabilitation and maintenance

a. The land rehabilitation and maintenance (LRAM) component is a key enabler for sustaining realistic training conditions...

TC 25-1

“Adequate realistic and complex maneuver/training areas, the Army’s “outdoor classroom”, are one of the most critical training resources in the Live...”

Army Training Concept 2012-2020 White Paper

“...provide high-fidelity replications of the complex operational environment.”

Army Training Strategy (12 Nov 09)

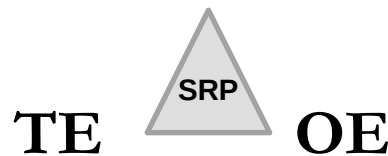
“...support both institutional and operational training and to create training conditions that realistically portray the operational environment.”

Similar cites in Op Environment Master Plan (Sep 09), HST Master Plan (Sep 07) and Small Unit Ops in Afghanistan TTPs (Jun 09)

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Problem Statement:

*LRAM marginally enhances
training realism*



TE = Training Environment
OE = Operational Environment



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Notes from a AAR

- **Road craters: 12 x 12, 6 foot deep**
- Urban confined driving-buildings, walls, curves. Only 1 foot wider than vehicle.
- Unimproved roads, sheer up and down on either sides. Switchbacks and tight turns. Must use ground guides.
- **MOUT TE is not Afghan. Buildings should be mud and stone, cheap metal doors, right on roads.**
- Need advanced recovery operations lane. Try to recover vehicles with no axles, upside down, blown up. Lane for recovery vehicle operators and mechanics.
- Roads in training areas are way too well improved. Should be extremely narrow with blast holes, narrow choke points. Think like the enemy.
- Dismounted IED lanes surrounded by enemy/friendly fighting positions. On command or wired IEDs. Soldiers should train dismount/mount techniques while convoy moves down road.
- Mountainous terrain difficult for vehicles and dismounts. Replicate this as much as possible. It's not the high altitude, but ruggedness and climbing. C2 of dismounts, comms between vehicles and dismounts.
- **Culverts everywhere, 85% made from corrugated iron, others cement. Need to train check and clear culverts.**
- In some locations road has cleared terrain 200-300 meters on each side, and has pressure plate mines in cleared areas.
- **While walking thru tall grass, Soldiers step/fall into holes and terrain drops.**
- Enemy may string IED wires between trees not on ground
- Road clearance mission was 60-70 km per day, 2/3 paved, 1/3 unimproved. Good training course would be 10-15 km long-maybe only 6km if a lot of IEDs
- **Croplands around MOUT sites**

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Dismounted operations in
Wardak Province of
Afghanistan.



Soldiers conducting
dismounted command wire
sweeps in mountains of Konar
, Afghanistan.



Agricultural Landscapes and Farm Complexes

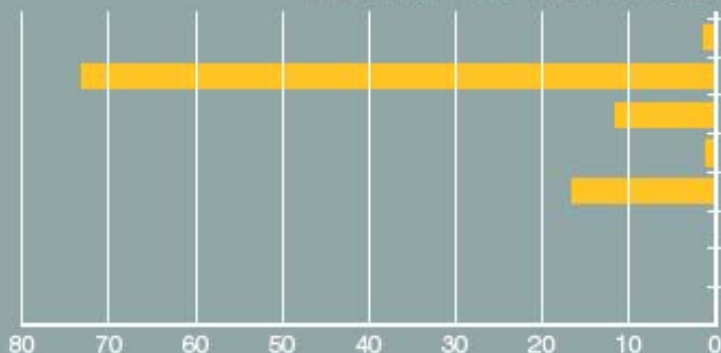
Operating Environment (OE)



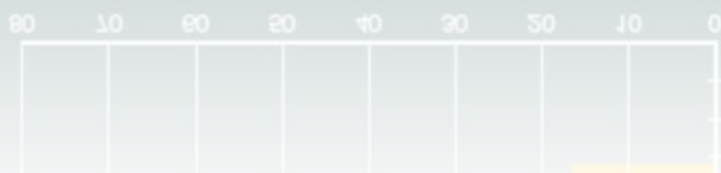
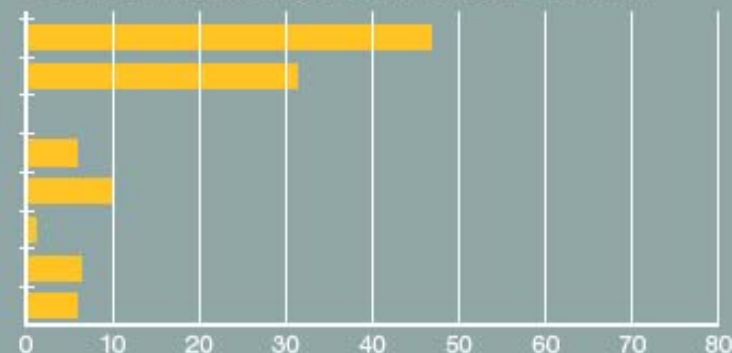
Training Environment (TE)



Afghanistan Land Use / Land Cover



USAREUR Major Training Areas Land Use / Land Cover



How can LRAM enable *a realistic TE?*





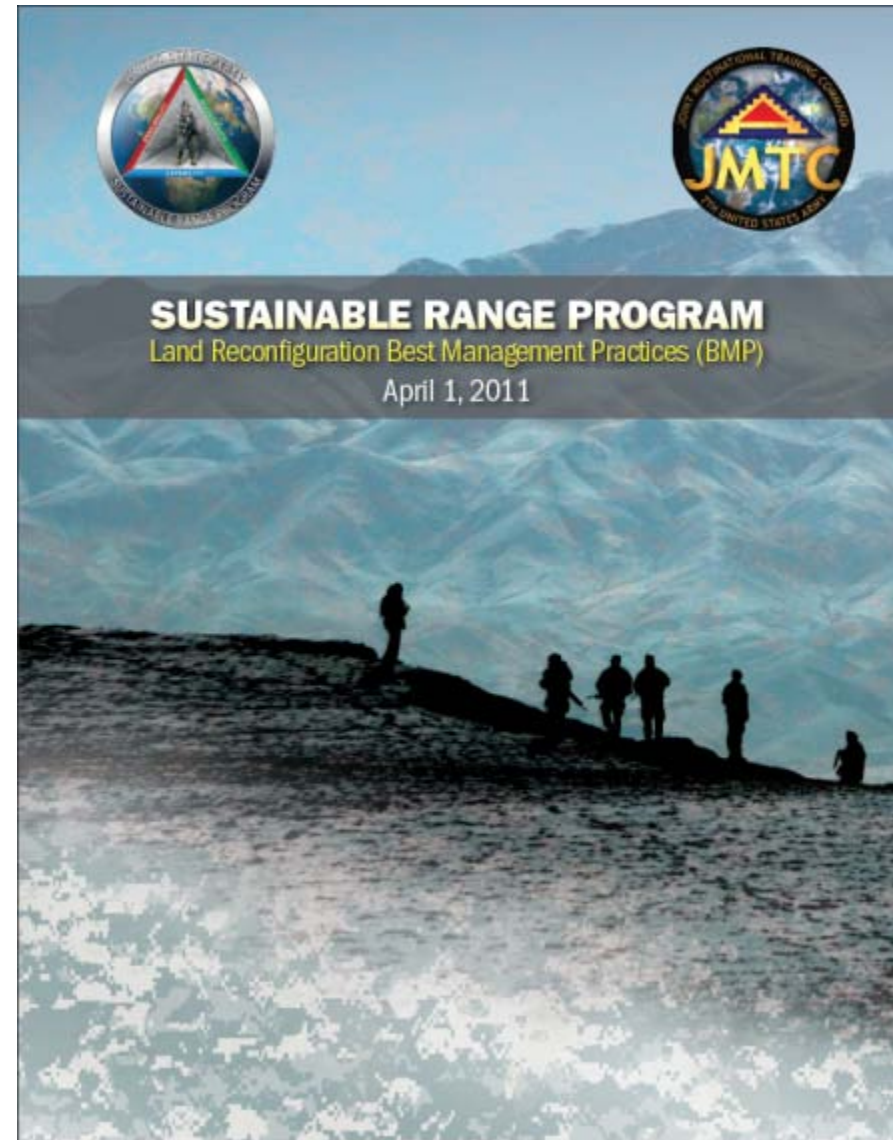
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LRAM Reconfiguration Best Management Practices (BMP)

Describes:

- **Cost**
- **Validity**
- **Appearance**
- **Construction plans**
- **Training requirement**



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Agricultural Landscape and Farm Complexes?

SUSTAINABLE RANGE PROGRAM Land Reconfiguration Best Management Practices (BMP)

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SPECIAL CONDITIONS

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SUSTAINABLE RANGE PROGRAM

Land Reconfiguration Best Management Practices (BMP)

What this BMP Describes.

- ✓ The Afghanistan Contemporary Operating Environment (COE)
- ✓ Rural and agricultural conditions challenging our Soldiers
- ✓ An agricultural complex with basic infrastructure, vegetation, and terrain
- ✓ Restrictive terrain and undeveloped transportation network
- ✓ How to create these enhancements in training areas

Why this is important to the Soldier.

- ✓ Soldiers operate in these conditions daily with great risk
- ✓ Provides realistic conditions for security, patrolling, pursuing the enemy, and working with the local populace
- ✓ Training in these conditions increases mission success and minimizes risk in the COE
- ✓ Illegal crop locations are the main source of revenue for the enemy and a high risk area for our Soldiers
- ✓ Reduces the learning curve in-theater

Why you should use this Guide.

- ✓ Training areas do not provide the realism of the Afghanistan COE
- ✓ Soldiers must have the best training environment
- ✓ This template provides the basic project planning considerations to get you started
- ✓ Use this BMP to develop all the requirements for a project submission

1

REPLICATED AGRICULTURAL TERRAIN

Version 3.0 (15 Mar 11)

Agricultural Landscape and Farm Complexes?



SUSTAINABLE WATER PROGRAM Land Reconfiguration Best Management Practices (BMP)

HOW THIS BMP WILL SUPPORT FIGHTING IN FARMS AND FIELDS

Where are these conditions?

The conditions described are found in Afghanistan, where roughly 25% of the land is available for agriculture and 5% is suitable for farming. There are approximately 1.2 million farms with arable land in Afghanistan, and 75% are smaller than 5 ha. The typical Afghan farm produces subsistence living for its owner and his family; only a few are considered commercial enterprises. Nonetheless, agriculture is the primary economic driver in the rural provinces. Few farms are supported by mechanization or have storage facilities for holding harvested crops, and most have form of irrigation. Primary crops are wheat, corn, rice, cotton, fruit (e.g., grapes, melons, apricots), and nuts (e.g., almonds and pistachios). Some pastures used for grazing are unenclosed; harvested crop land and crop residues are the source of animal feeds. Grazing can be done through seasonal migration between the plains and mountains or in community-owned livestock conditions.

What are these conditions like?

The Afghan farm (less than 5 ha) has smaller flat or terraced fields of irregular shape divided by either the flat or rising terrain. The fields are surrounded or separated by a combination of mud and stone irregular-shaped berms 1 m wide and tall; mud or stone walls as high as 3.5 m; irrigation ditches less than 0.3 m wide and deep or larger irrigation ditches 3-5 m wide; narrow trails or unpaved single-lane roads; or a combination of these. Berms are low. Gateways in walls/berms are high thresholds as potential improvised explosive devices (IED) sites. The fields have uneven surfaces and may be dry or filled with water given the time of year, type of crop, and irrigation conditions. Terraced fields are extremely difficult to traverse. Farm buildings are one or two stories with corrugated steel, thatch, or tile roofs and are generally enclosed by a 5-3 m perimeter wall. A variety of building materials are used: adobe/mud, stone, brick or cobblestone.

How do these conditions affect units and Soldiers?

Units and Soldiers are in the farming villages conducting combat and security patrol, gathering both friendly and enemy intelligence, fighting the Taliban and insurgents, and assisting and interacting with the local population. The disoriented Soldier moves around and through the agriculture and farms where he faces direct and indirect enemy threats. The enemy influences the local populace with the income it gets from illegal crop harvest and fiercely defends these areas. The surrounding elevation, walls, berms, and trees can all provide the enemy observation, fighting, and sniper positions. The trails, roads, irrigation ditches, and fields are all potential IED and landmine locations. Tilled fields are hiding places for weapons caches. The risk of conflict can vary by season and harvest. In these conditions units and Soldiers must be trained and competent in: patrolling; local security; border and sector; reaction to ambush; hasty attack; hasty defense; and IED identification, defeat, and destruction.

Why complete this project?

Completing this project will provide squad, platoon, and company size units the conditions found in rural Afghanistan in which they can: train on simple land navigation; conduct an analysis of friendly and enemy tactical use of terrain; develop overall a tactical maneuver; plan and execute a tactical scheme of maneuver; plan and execute direct and indirect fires; and react to IEDs, mine fields, and enemy direct or indirect fires. Given the importance of these small farms and agricultural terrain, units and Soldiers must learn how to live and maneuver without unnecessary damage to crops and infrastructure and avoid alienating the local populace.

How do I do it?

Use this BMP to develop a Land Reconfiguration Project to provide units and Soldiers the rural "agro-rural" conditions they will encounter in undeveloped and restrictive terrain. The ideal location should be adjacent to or within the buffer region of Military Operations in Urban Terrain (MOUT) areas. The first step is identifying an area of approximately 10 ha with flat and sloping terrain with basic trail and trail access. Terraced fields are an option. The next step is dividing the terrain with a combination of terraced and tilled fields, hedgerows, berms, walls, trails, and irrigation ditches. The third step is identifying and planning which vegetation will grow 1 m to 2 m high to plant and sustain in the fields and if actual livestock is a realistic option.



SUSTAINABLE WATER PROGRAM Land Reconfiguration Best Management Practices (BMP)



Steeply sloping in a hilly area



Typical Afghan village



Village in a hilly area



Village in a hilly area

Agricultural Landscape and Farm Complexes?

REPLICATED AGRICULTURAL TERRAIN



SUSTAINABLE RANGE PROGRAM Land Reconfiguration Best Management Practices (BMP)



Farm along river near Kabul



Farm near Ghazni, Helmand Province



Wheat field, Kandahar, Jaghori District, Warshid Rural area



Foot path through cultivated area



SUSTAINABLE RANGE PROGRAM Land Reconfiguration Best Management Practices (BMP)

PROJECT OVERVIEW

The purpose of this BMP is to provide guidance on creating a realistic rural and agricultural training environment for units and Soldiers as found in the COE. The complete agricultural complex includes: small farm buildings surrounded by mud and rock walls; trail networks; crop or simulated crop fields; orchards; vineyards and a (dry) irrigation system. The complex can range in size from 3-10 ha on sloping land to 1-3 ha on flat land. The shape, elevation, slope, and size of the fields, orchards, and vineyard will vary according to the terrain; they are never square or symmetrical. A land cover analysis of a 1 km buffer region around Afghan settlements found that 74% of the area are flat fields, less than 1% sloping terraced fields, and the remainder split between orchards and vineyards. The number of farm buildings should range between three to six single-story buildings.

The farms should be sub-divided into smaller fields, orchards, vineyards, and livestock pens. The crude (mud or brick) farm buildings are surrounded by a 1.5 m to 2 m mud and rock wall with not more than two portals, large enough for a person and small cart or wagon to pass through. The buildings or

exterior wall can be contiguous with the agricultural fields or separated from them by unimproved trails, dry hand-dug irrigation ditches or open space and a windrow of trees.

The fields should be uneven and roughly tilled to increase the difficulty of walking through them. The fields can be planted with real crops (e.g., wheat and corn) or native grasses that grow to 1.5 m to 2 m high to replicate crops. On sloping terrain, the fields are terraced with an elevation change of 1 m or less between them. The fields are separated either by hand-dug irrigation ditches (0.5 m or less in depth and width) or berms constructed out of mud, rocks, straw, and other available materials. The berms are uneven in shape, to include the top, and narrow.

If feasible, the agricultural complex should be within small arms range of a wooded area, even a row of trees, or within observation of high ground that would support enemy sniper and mortar attacks. Trails and fields are always potential IED emplacement sites. The surrounding trail network of approach trails should support mounted and dismounted maneuvers.

SITE SELECTION CONSIDERATIONS

1. A minimum of 1-3 ha on flat ground or 3-10 ha on sloping ground is required for a single farm.
2. There must be an unimproved trail and trail network that runs to and from the farm site and village that can support small pickup trucks, motorcycle/bicycles, tractors with wagons, and foot traffic. Single lane traffic is the most common.
3. If feasible, there should be a source of water to provide or simulate irrigation.
4. The complex of two to three buildings should be within 500 m (small arms range) of a wooded area/compound (MOUT site) that is accessible on foot or by small farm vehicle.
5. The agricultural fields should be able to be tilled and terraced.
6. Trees or a wooded area should be nearby and provide (enemy) cover and concealment.
7. This use of land should have a minimum impact on other established maneuver land and/or range use.

SHOW STOPPERS

1. The complex requirement (e.g., field, village, irrigation, trails) interferes with or prohibits existing use of or access to other maneuver areas and/or ranges.
2. Building or sustaining this project will disturb known natural resources and cultural resources and has unmitigable erosion impacts.
3. Materials to use to build berms, walls, and irrigation sources or unavailable or not permitted in the training areas.

REPLICATED AGRICULTURAL TERRAIN

Agricultural Landscape and Farm Complexes?

1 REPLICATED AGRICULTURAL TERRAIN

OVERVIEW—REPLICATED AGRICULTURAL TERRAIN

Farm Village



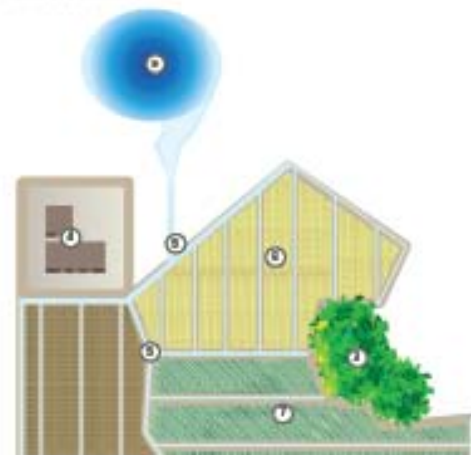
LEGEND	
1	Maneuver trail
2	River
3	Tree
4	Farm with wall, two buildings
5	Irrigation ditch
6	Fields with beams
7	Terraced fields
8	Village/MOUT site
9	Pond

11

2 REPLICATED AGRICULTURAL TERRAIN

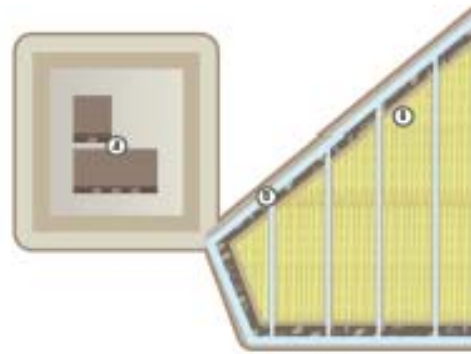
OVERVIEW—REPLICATED AGRICULTURAL TERRAIN

Terraced Fields



LEGEND	
1	Maneuver trail
2	River
3	Tree
4	Farm with wall, two buildings
5	Irrigation ditch
6	Fields with beams
7	Terraced fields
8	Village/MOUT site
9	Pond

Single Field



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Agricultural Landscape and Farm Complexes?



SUSTAINABLE RANGE PROGRAM Land Reconfiguration Best Management Practices (BMP)

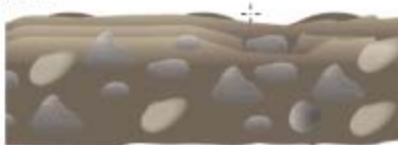
OVERVIEW—FARM COMPLEX

Berms

Top view



Side view

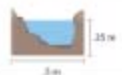


Made of earth materials—mud and rocks

Irrigation Ditch



Feeder (1 m wide and 1 m deep)
Hard-packed gravel, sides and bottom. Excavated by hand



Tertiary (0.5 m wide and 0.25 m deep)
Hand-dug, dirt sides and bottoms



SUSTAINABLE RANGE PROGRAM Land Reconfiguration Best Management Practices (BMP)

PROJECT DESCRIPTION

(EXAMPLE ONLY)

There are 5 ha in Training Area 9 adjacent to MOUT Site 9a that will be reconfigured into a Replicated Agricultural Terrain complex. The existing MOUT site will replicate the farm village complex. If feasible, a mud and rock wall 1.5 to 2 m will enclose the MOUT site, with openings where each maneuver trail enters the MOUT site. A small farm consists of three building (e.g., slippery containers) will be located approximately 0.5 km from the MOUT site and also connected to the crop fields and orchard by maneuver trails. The farm will be enclosed by a mud and rock wall 2 m high, with an opening.

In the area adjacent to the MOUT site, there will be two sets of simulated crop fields. One set will be subdivided into three small plots, divided by mud and rock berms 0.5 m high, and planted with native grasses. Another set will be subdivided into three terraced fields, with an elevation change between each of 0.5 m and also separated by mud and rock berms. These fields will also be planted with native grasses. The fields should be roughly tilled. If feasible, a dry irrigation ditch will be hand-excavated

along side both sets of fields.

One orchard will be created out of a small wooded lot approximately 60 m by 40 m on the north side of the MOUT site (about 0.5 km from the MOUT site). A new orchard will be planted with fruit or nut trees, depending on availability and cost, on a recently cleared 50 m by 50 m area adjacent to the east side of the village. After the orchard adjacent to the MOUT site has been established (one season), a 1 m mud and stone wall will be constructed around the orchard, with portals on the east and west sides.

To the south of the MOUT site a small 30 m by 30 m simulated "ju" vineyard will be established and surrounded on three sides by a 0.3 m high berm. The vines will be planted in small mounds approximately 3 m apart and will grow along the tops of the connected mounds. A dry hand-excavated irrigation ditch will run along the north side of the vineyard.

Project Title:	GTA1215	Project ID:	GTA1215
Project Number:	GTA1222, 1223	Project Purpose:	Replicate Agricultural Terrain
Training Area:	GTA	Estimated Costs:	\$36,110
Location:	Training Area 9	Hectares of Work:	7
Fiscal Year:	2011	DO 1354:	Yes
Priority:	1	In-House or Contracted	Contracted
Quarter:	1		
Estimated Timeline:	5 months		

OTHER RELEVANT RECONFIGURATION BMPS

(EXAMPLE ONLY)

Relevancy	#	Title	Relevancy	#	Title
N/A	1	Replicated Agricultural Terrain	Low	13	Man-made and Natural Obstacles
High	2	Terraced Fields	Low	20	Rugged Dismounted Maneuver Trails
High	3	Vineyards	Low	21	Rugged land Navigation Course
High	4	Orchards	Low	22	Caves and Tunnels
Medium	10	Rugged Mounted Maneuver Trails	Low	30	Helicopter Landing Zones
Low	11	Unimproved Water Crossings	Medium	31	Culverts in Operational Environments
Low	12	Vehicle Recovery Site			

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REPLICATED AGRICULTURAL TERRAIN

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Agricultural Landscape and Farm Complexes?

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REPLICATED AGRICULTURAL TERRAIN



SUSTAINABLE RANGE PROGRAM Land Reconfiguration Best Management Practices (BMP)

SCHEDULE OF QUANTITIES—COST ESTIMATE

(EXAMPLE ONLY)

	Work Item	Quantity	Unit	Metric Unit	Unit Cost	Cost
1	Mobilization costs	1	ea		\$700	\$700
2	Soil	1,000	cy	1,100 m ³	\$10	\$11,000
3	Crushed rock	500	cy	540 m ³	\$10	\$5,400
4	Seeding (grass)	500	cy	540 m ³	\$1	\$540
5	Excavator	1	1 week		\$500	\$500
6	Bulldozer	1	1 week		\$500	\$500
7	Harrow/tiller	1	1 week		\$500	\$500
8	Dump truck	1	3 weeks		\$250	\$750
9	Technician	80	hr		\$60	\$4,800
10	Laborer	120	hr		\$45	\$5,400
11	Ancillary costs					\$6,020
					Total:	\$36,110

PROJECT SCHEDULE

(EXAMPLE ONLY)

Milestones	Complete by Day (D+)
Develop Project Description, Estimate, and Site Alternatives	14
Complete Environmental Assessment and Select Final Site	21
Complete Site Survey and Develop Reconfiguration Plans	35
Develop Project Schedule, Order Materials, and Reserve Equipment	45
Complete Land Reconfiguration	105
Plant Grasses and Other Vegetation	115
Conduct Site Inspection	135
Available for Training	150

Construction/Engineering Notes:



SUSTAINABLE RANGE PROGRAM Land Reconfiguration Best Management Practices (BMP)

ENVIRONMENTAL REQUIREMENTS

(EXAMPLE ONLY)

	Required (y/n)	Complete (y/n)	Reference
Preliminary Review:	Y	N	
Environmental Review Guide:	N	N	
Environmental Assessment/ Environmental Impact Statement/ Finding of No Significant Impact:	Y	N	
Landscape Management Plan:	Y	N	
Mitigation: Required: y ☐ n ☐ Account: Eco ☐ Forestry ☐ Other: ☐ Mitigation Plan: y ☐ n ☐			
Comments:			
Estimated Costs:			

PROJECT SUSTAINMENT REQUIREMENTS

(EXAMPLE ONLY)

Task	Description	Frequency	Estimated Cost
Maintain crops	Fertilize and weed	Monthly	\$1,000/annually
Repair berms around fields	Ensure that berms can support dismounted troops	Quarterly	\$1,000/annually
Clean out irrigation ditches & culverts	Ensure that water can flow through ditches and culverts	Quarterly	\$1,000/annually
Erosion control	Monitor and repair erosion in and around complex	Quarterly	\$1,000/annually

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REPLICATED AGRICULTURAL TERRAIN

Agricultural Landscape and Farm Complexes?

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REPLICATED AGRICULTURAL TERRAIN

**SUSTAINABLE RANGE PROGRAM** Land Reconfiguration Best Management Practices (BMP)

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Construction/Engineering Notes:

**SUSTAINABLE RANGE PROGRAM** Land Reconfiguration Best Management Practices (BMP)

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(EXAMPLE ONLY)

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Comments:			
Estimated Costs:			

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(EXAMPLE ONLY)

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REPLICATED AGRICULTURAL TERRAIN

Agricultural Landscape and Farm Complexes?

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SUSTAINABLE RANGE PROGRAM

Land Reconfiguration Best Management Practices (BMP)

1 REPLICATED AGRICULTURAL TERRAIN

2 TERRACED FIELDS

Version 1.1 (24 Mar 11)

■ What this BMP Describes.

- ✓ The Afghanistan Contemporary Operating Environment (COE)
- ✓ Terraced fields of various sizes and characteristics
- ✓ Terraced Fields as a component of Replicated Agricultural Terrain
- ✓ Movement and security risks in terraced fields
- ✓ How to use and create these enhancements in your training areas

■ Why this is important to the Soldier.

- ✓ Soldiers and units encounter terraced fields when patrolling near farms and villages
- ✓ Terraced fields are an excellent location for employing Improvised Explosive Devices (IED)
- ✓ Terraced fields are used by the enemy to hide weapons, munitions, and other items of interest
- ✓ Moving across terraced fields is difficult, and searching for enemy materials is a critical task
- ✓ Training in the right conditions gives the Soldier confidence that he/she can move quickly through the terraced fields, mitigating risk in the COE

■ Why you should use this Guide.

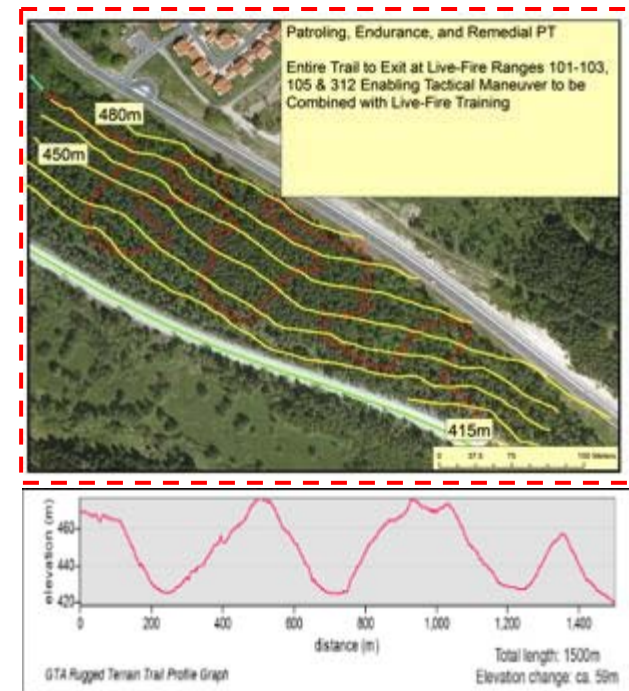
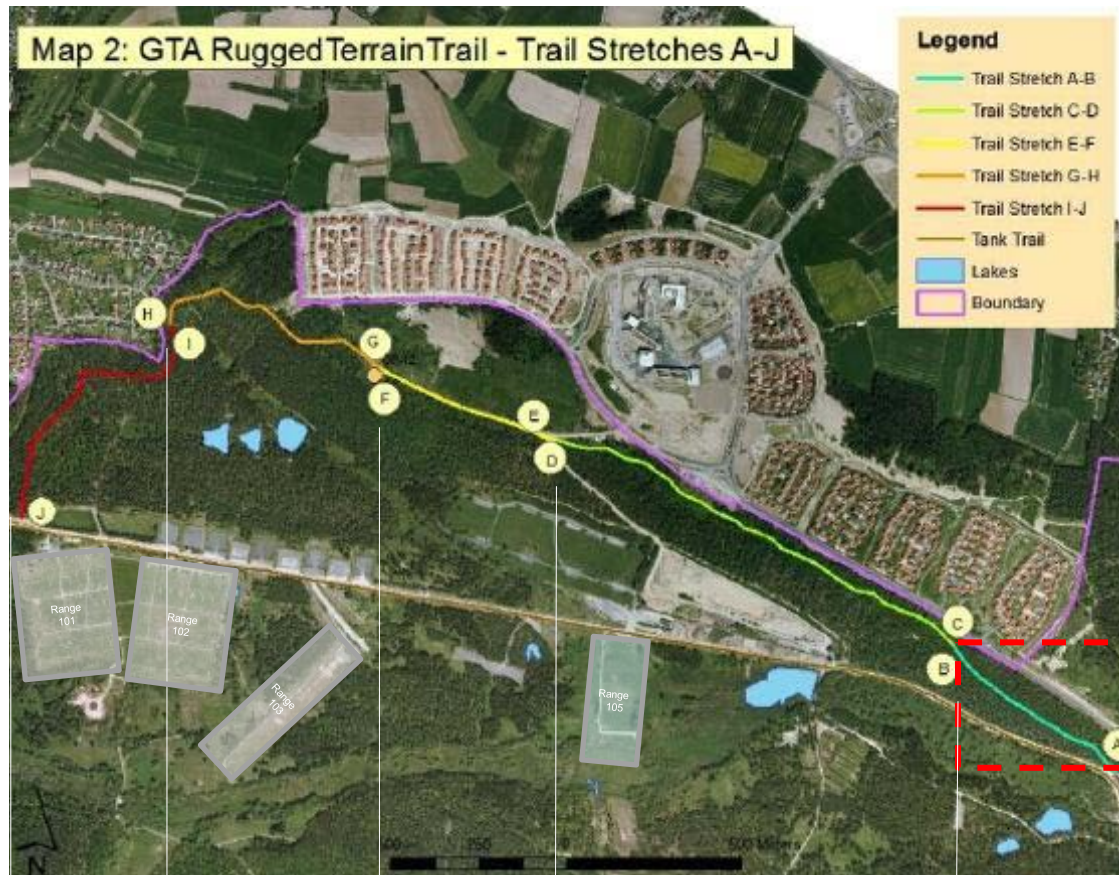
- ✓ Installations have open and sloping terrain that can be turned into terraced fields
- ✓ Replicated terraced fields enhance the realism of the Replicated Agricultural Terrain BMP
- ✓ Soldiers must have the best and most realistic training conditions
- ✓ This template provides the basic planning considerations needed to develop and coordinate this project with appropriate installation staff
- ✓ Using this template will enable you to develop all the requirements for a project submission

Any Mission, Anywhere

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As of 29 Apr 2011

Dismounted Movement/Rugged Terrain



H-J	F-H	D-F	B-D	A-B	
850	800	515	1,335	600	Length (m)
1	20	1	11	23	Avg Slope (%)
3	33	2	14	30	Max Slope (%)



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Way Ahead

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Way Ahead



- **13 LRAM Reconfiguration BMPs will be available on USAREUR and DA SRP websites**

- **Requirements**
 - **Talk to your units.**
 - **Initially focus on enhancing MOUT buffer regions and associated ingress/egress maneuver trails**
 - **Is increasing training realism an objective?**

- **Ensure your Training Area Working Groups are active and ready**
 - **Much easier to install a check dam than a wheat field**
 - **Much easier to fix a road than to leave it / worsen it**

- ***The OE will change over time, but so should the TE***

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USAREUR Sustainable Range Program (SRP)

Jeff Andrews
USAREUR ITAM Program Manager
DSN 475-6902
COM +49 9641 83 6902
Jeffrey.a.andrews@us.army.mil

7th US Army JMTc
Attn:AETT-STS-TS (Bldg 3007)
Unit 28130; Camp Normandy
APO AE 09114-8130

Army Range Mapper:
<https://srp.usareur.army.mil>

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